IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

Presiding Member's Proposed Decision

CALIFORNIA
ENERGY COMMISSION
Arnold Schwarzenegger, Governor

AUGUST 2010
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DOCKET NUMBER 07-AFC-5

CALIFORNIA
ENERGY COMMISSION

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http://www.energy.ca.gov/sitingcases/ivanpah/index.html

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DISCLAIMER

This report was prepared by the California Energy Commission Ivanpah Solar Electric Project AFC Committee as part of Ivanpah Solar Electric Generating System, Docket No. 07-AFC-5. The views and recommendations contained in this document are not official policy of the Energy Commission until the report is adopted at an Energy Commission Business Meeting.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
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The Committee hereby submits its Presiding Member's Proposed Decision for the ***IVANPAH SOLAR ELECTRIC GENERATING SYSTEM*** (Docket Number 07-AFC-5). We have prepared this document pursuant to the requirements set forth in the Commission's regulations. (20 Cal. Code Regs., §§ 1749-1752.5.)

The Committee recommends that the Application for Certification be approved, subject to the Conditions of Certification set forth herein, and that the Energy Commission grant the Project Owner a license to construct and operate the Project.

Dated: August 3, 2010, at Sacramento, California.

JEFFREY D. BYRON
Commissioner and Presiding Member
Ivanpah AFC Committee

JAMES D. BOYD
Vice Chair and Associate Member
Ivanpah AFC Committee

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INTRODUCTION

A. SUMMARY OF THE DECISION

This Decision contains the Commission's rationale in approving the Ivanpah Solar Electric Generating System (ISEGS) project. Although the project, even with the mitigation measures described in this Decision, will have remaining significant impacts on the environment, the Commission has found that the benefits the project would provide override those impacts. In addition, the Commission has determined that the ISEGS project complies with all applicable laws, ordinances, regulations, and standards (LORS). This Decision is based exclusively upon the record established during this certification proceeding and summarized in this document. We have independently evaluated the evidence, provided references to the record[1] supporting our findings and conclusions, and specified the measures required to ensure that the ISEGS project is designed, constructed, and operated in the manner necessary to protect public health and safety, promote the general welfare, and preserve environmental quality.

On August 31, 2007, Solar Partners I, LLC, Solar Partners II, LLC, Solar Partners IV, LLC and Solar Partners VIII, LLC (subsidiaries of BrightSource Energy, Inc.), submitted a single Application for Certification (AFC) to the California Energy Commission to develop three solar thermal power plants and shared facilities in close proximity to the Ivanpah Dry Lake, in San Bernardino County, California on federal land managed by the Bureau of Land Management (BLM). The proposed ISEGS project would generate 370 megawatts (MW). The Energy Commission has exclusive jurisdiction to license this project and is considering the proposal under a 12-month review process established by Public Resources Code section 25540.6. The BLM is conducting its own concurrent process to determine whether to approve an amendment to the 1980 California Desert Conservation Area Plan and a right-of-way grant authorizing the construction and operation of the ISEGS on federal lands. On October 31, 2007, the Energy Commission began review of the ISEGS.

The ISEGS would be constructed in three phases: one 120-MW phase (known as Ivanpah 1) and two 125-MW phases (known as Ivanpah 2 and Ivanpah 3). Ivanpah 1 would be 920 acres, Ivanpah 2 would be 1,097 acres, and Ivanpah 3

[1] The Reporter's Transcript of the evidentiary hearings is cited as "date of hearing RT page __." For example: 12/14/09 RT 77. The exhibits included in the evidentiary record are cited as "Ex. number." A list of all exhibits is contained in **Appendix B** of this Decision.

would be 1,227 acres. (Ex. 88, p. 2-2.) They would be located in southern California's Mojave Desert, to the west of Ivanpah Dry Lake, in San Bernardino County, 4.5 miles southwest of Primm, Nevada, and 3.1 miles west of the California-Nevada border in Townships 16 and 17 North, Range 14 East, San Bernardino Meridian.

The proposed project includes three solar concentrating thermal power plants, based on distributed power tower and heliostat mirror technology, in which heliostat (mirror) fields focus solar energy on power tower receivers near the center of each heliostat array, creating steam to drive steam generators. The three phases would share a Construction Logistics Area -- common facilities including an administration building, operations and maintenance building, substation, access road, and reconductored transmission lines. The Construction Logistics Area is located between Ivanpah 1 and Ivanpah 2. The total area required for all three phases including the shared facilities would be approximately 3,600 -acres (or 5.6 square miles).

Ivanpah 1, 2, and 3 would be interconnected to the Southern California Edison (SCE) grid through upgrades to SCE's 115-kV line passing through the site on a northeast-southwest right-of-way. The proposed Ivanpah Substation would be owned and operated by SCE. The California Public Utilities Commission and the Bureau of Land Management are currently reviewing the proposed substation as part of the Eldorado-Ivanpah Transmission Project (see the CPUC's website at http://www.cpuc.ca.gov/Environment/info/ene/ivanpah/Ivanpah.html for additional information on that project).

Natural gas for the ISEGS would be supplied from the Kern River Gas Transmission Company pipeline about 0.5 miles north of the Ivanpah 3 site.

Raw ground water would be drawn from one of two wells, located on the northwest corner of Ivanpah 1, which would provide water to all three plants. Each well would have sufficient capacity to supply water for all three phases. Actual water use is not expected to exceed 100 acre feet per year for all three plants. Groundwater would go through a treatment system for use as boiler make-up water and to wash the heliostats. No wastewater would be generated by the system, except for a small stream that would be treated and used for landscape irrigation.

The Applicant indicates that it would take 48 months to complete the project with construction expected to cost approximately $300 million, for Ivanpah 1, $280

million for Ivanpah 2, and $520 million for Ivanpah 3. Commercial operation would begin during the third quarter of 2010 and be completed during the fourth quarter 2013, if approved by the Energy Commission. The Applicant proposes to begin project construction during the fall of 2010.

Personnel requirements would be minimal during the mobilization and site grading period and during the startup and testing period. There would be an average and peak workforce of approximately 474 and 959, respectively, of construction craft people, supervisory, support, and construction management personnel on site during construction. During operations; an estimated workforce of 90 full time equivalent personnel would be needed to staff the facility 24 hours per day/seven days per week. (Ex.300, p. 6.8-11.)

B. SITE CERTIFICATION PROCESS

The ISEGS and its related facilities are subject to Energy Commission licensing jurisdiction. (Pub. Res. Code, § 25500 et seq.). During licensing proceedings, the Commission acts as lead state agency under the California Environmental Quality Act (CEQA). (Pub. Res. Code, §§ 25519(c), 21000 et seq.) The Commission's regulatory process, including the evidentiary record and associated analyses, is functionally equivalent to the preparation of an Environmental Impact Report. (Pub. Res. Code, § 21080.5.) The process is designed to complete the review within a specified time period when the required information is submitted in a timely manner; a license issued by the Commission is in lieu of other state and local permits.

The Commission's certification process provides a thorough review and analysis of all aspects of a proposed power plant project. During this process, the Energy Commission conducts a comprehensive examination of a project's potential economic, public health and safety, reliability, engineering, and environmental ramifications.

The Commission's process allows for and encourages public participation so that members of the public may become involved either informally or on a formal level as intervenor parties who have the opportunity to present evidence and cross-examine witnesses. Public participation is encouraged at every stage of the process.

The process begins when an Applicant submits an AFC. Commission staff reviews the data submitted as part of the AFC and makes a recommendation to

the Commission on whether the AFC contains adequate information to begin the certification process. After the Commission determines an AFC contains sufficient analytic information, it appoints a Committee of two Commissioners to conduct the formal licensing process. This process includes public conferences and evidentiary hearings, where the evidentiary record is developed and becomes the basis for the Presiding Member's Proposed Decision (PMPD). The PMPD determines a project's conformity with applicable laws, ordinances, regulations, and standards and provides recommendations to the full Commission.

The initial portion of the certification process is weighted heavily toward assuring public awareness of the proposed Project and obtaining necessary technical information. During this time, the Commission staff sponsors public workshops at which Intervenors, agency representatives, and members of the public meet with Staff and Applicant to discuss, clarify, and negotiate pertinent issues. Staff publishes its initial technical evaluation of the Project in its Staff Assessment (SA), which is made available for a 30-day public comment period. Staff's responses to public comment on the SA and its complete analyses and recommendations are published in the Final Staff Assessment (FSA, also Exhibit 300).

Following this, the Committee conducts a Prehearing Conference to assess the adequacy of available information, identify issues, and determine the positions of the parties. Based on information presented at this event, the Committee issues a Hearing Order to schedule formal evidentiary hearings. At the evidentiary hearings, all formal parties, including intervenors, may present sworn testimony, which is subject to cross-examination by other parties and questioning by the Committee. Members of the public may offer oral or written comments at these hearings. Evidence submitted at the hearings provides the basis for the Committee's analysis and recommendations to the full Commission.

The Committee's analysis and recommendations appear in the PMPD, which is available for a 30-day public comment period. Depending upon the extent of revisions necessary after considering comments received during this period, the Committee may elect to publish a revised version, which may trigger an additional public comment period. Finally, the full Commission decides whether to accept, reject, or modify the Committee's recommendations at a public hearing.

Throughout the licensing process, members of the Committee, and ultimately the Commission, serve as fact-finders and decision-makers. Other parties, including the Applicant, Commission staff, and formal intervenors, function independently with equal legal status. An "ex parte" rule prohibits parties in the case, or other persons with an interest in the case, from communicating on substantive matters with the decision-makers, their staffs, or assigned hearing officer unless these communications are made on the public record. The Office of the Public Adviser is available to assist the public in participating in all aspects of the certification proceeding.

C. PROCEDURAL HISTORY

Public Resources Code, sections 25500 et seq. and Energy Commission regulations (Cal. Code Regs., tit. 20, § 1701, et seq.) mandate a public review process and specify the occurrence of certain procedural events in which the public may participate. The key procedural events that occurred in the present case are summarized below.

On August 31, 2007, Solar Partners I, LLC, Solar Partners II, LLC, Solar Partners IV, LLC and Solar Partners VIII, LLC (Solar Partners), submitted a single Application for Certification (AFC) to the California Energy Commission to develop three solar thermal power plants and shared facilities in close proximity to the Ivanpah Dry Lake, in San Bernardino County, California on federal land managed by the Bureau of Land Management (BLM). The initially proposed Ivanpah Solar Electric Generating System (ISEGS) project would generate 400 megawatts (MW).

On October 31, 2007, the Energy Commission deemed the AFC data adequate (sufficient data to proceed) and assigned a Committee of two Commissioners to conduct proceedings.

The formal parties included the Applicant, the Energy Commission staff (Staff), California Unions for Reliable Energy (“CURE”), Western Watersheds Project, Sierra Club, Defenders of Wildlife, Basin and Range Watch, Center for Biological Diversity, California Native Plant Society, and the County of San Bernardino

On December 10, 2007, the Committee issued a Notice of "Informational Hearing and Site Visit" to be held in Primm, Nevada, on January 4, 2009. The Notice was mailed to local agencies and members of the community who were known to be interested in the project, including the owners of land adjacent to or in the vicinity

of 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. The Committee and other members of the Energy Commission staff were unable to attend the Informational Hearing as scheduled due to flight cancellations caused by a massive rain storm in Sacramento, necessitating the rescheduling to January 25, 2009. Those who were able to make it to the site on January 4 were able to attend an informal site visit.

The Public Adviser's Office of the Energy Commission (PAO) also identified and similarly notified local officials with jurisdiction in the project area. The PAO placed a notice in *The Desert Press and the Daily Dispatch*

On Friday, January 25, 2008, the Committee conducted a Site Visit to tour the proposed ISEGS site and then convened a public Informational Hearing at the Primm Valley Golf Club in San Bernardino County. At that event, the Committee, the parties, interested governmental agencies, and other public participants discussed issues related to development of the project, described the Commission's review process, and explained opportunities for public participation. On January 31, 2008, the Committee issued the Initial Scheduling Order for the proceedings.

On April 24, 2008, The Committee issued an Order Extending Deadline For Data Request. The Applicant, Staff, and Intervenor California Unions for Reliable Energy, jointly stipulated and the Committee concurred that additional time for requests for information without a required showing of good cause is consistent with facilitating further public participation in this proceeding.

The Staff of the Energy Commission and the Bureau of Land Management (BLM) conducted a workshop on Monday, June 23, 2008 in Primm Nevada. The purpose of the workshop was to discuss Applicant's responses to the Energy Commission's data requests for the following technical areas: air quality, alternatives, biological resources, closure and restoration plan, cultural resources, land use, project description, traffic and transportation, transmission system engineering, waste management, soil and water soil resources, and visual resources, and to facilitate the resolution of related issues and concerns. All interested agencies and members of the public were invited to participate.

The Committee issued its first Revised Committee Scheduling Order on September 26, 2008. Subsequent Revised Committee Scheduling Orders were

issued on October 29, 2008, June 2, 2009, July 15, 2009, The Committee also held a series of Committee Conference. The first of which was held on Wednesday, October 15, 2008, to consider the progress of the AFC to date and allow the Committee and parties to discuss ways in which the matter may most efficiently proceed to evidentiary hearings and to discuss any other matters relevant to the application. Additional Conferences were held on October 27, 2008, and May 18, 2009.

The Preliminary Staff Assessment (PSA) was published on December 11, 2008. The Staff provided notification by letter and held a PSA Workshop on January 9, 2009 in Primm, Nevada. The Final Staff Assessment (FSA) was released on November 4, 2009. Workshops were held on December 14, 15, and 22, 2009 to receive comments on the FSA/DEIS and to resolve outstanding issues among the parties. On March 17, 2010, Staff released its Final Staff Assessment Addendum.

On November 4, 2009, the Committee issued a Notice of Prehearing Conference and Evidentiary Hearing. The first prehearing conference was held on November 18, 2009, and the second prehearing conference was conducted on January 4, 2010. Evidentiary hearings were held on December 14, 15, 2009, and on January 11, 12, 13, and 14, 2010. All hearings were held at the Energy Commission headquarters in Sacramento.

On February 12, 2010, the Applicant filed a "Biological Mitigation Proposal ('Mitigated Ivanpah 3') for the Ivanpah Solar Electric Generating System (07·AFC·5)". The Applicant proposed "Mitigated Ivanpah 3" in an attempt to accommodate Commission Staff's suggestion, and those of some Intervenors, to reduce the botany and other biological resource impacts in Ivanpah 3 by avoiding construction in the northern-most section of the site, as well as to reduce botany impacts within the Construction Logistics Area. The following are key changes to the project as a result of "Mitigated Ivanpah 3":

- Removes approximately 433 acres from the northern portion of the Ivanpah 3 and more than 40,000 heliostats;
- Reduces the number of power towers in Ivanpah 3 from five to one, and of the entire Ivanpah project from seven to three;
- Relocates the power block for Ivanpah 3;
- Realigns the boundary between Ivanpah 2 and 3 and the heliostat fields;

- Realigns some roads and utilities within the project footprint;

- Relocates the administration building and water supply wells within the Construction Logistics Area; and

- Removes approximately 109 acres from construction use within the Construction Logistics Area.

(Ex. 88, p. 2-1.)

An additional evidentiary hearing was held on March 22, 2010 on the "Mitigated Ivanpah 3" in Sacramento.

The Committee published the PMPD on August 3, 2010. The 30-day comment period on the PMPD will expire on September 2, 2010.

D. COMMISSION OUTREACH

Several entities within the Energy Commission provide various notices concerning power plant siting cases. Staff provides notices of staff workshops and the release of the Preliminary and Final Staff Assessments. The Hearing Office notices Committee-led events such as the informational hearing and site visit, status conferences, the prehearing conference, and evidentiary hearings. The Public Adviser's Office provides additional outreach for critical events as well as provides information to interested persons that would like to become more actively involved in a power plant siting proceeding. Further, the Media Office provides notice of events to local and regional press through press releases. The public may also subscribe to the proceeding's e-mail List Server offered on the web page for each project which gives an immediate notification of documents posted to the project web page. Through the activities of these entities, the Energy Commission has made every effort to ensure that interested persons are notified of activities in this proceeding.

E. PUBLIC COMMENT

The record contains public comments from concerned individuals and organizations. Throughout these proceedings, as reflected in the transcribed record, the Committee provided an opportunity for public comment at each Committee-sponsored conference and hearing.

I. PROJECT DESCRIPTION AND PURPOSE

On August 31, 2007, the Applicant, BrightSource Energy, Inc.(BrightSource), filed an Application for Certification (AFC) with the Energy Commission seeking permission to construct and operate the Ivanpah Solar Electric Generating System (ISEGS) Project. The Applicant proposes to develop the ISEGS project as three power plants sharing some common infrastructure in separate and sequential phases that are designed to generate a total of 370 megawatts (MW) of electricity. Ivanpah 1 would each have an electrical generation capacity of 120 MW, and Ivanpah 2 and 3 a capacity of 125 MW each. (Ex. 88, p. 2-2, Ex. 300, p. 3-1 to 3.3; Ex. 315, p. 2-4.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Project Location

The ISEGS project would be located on approximately 3,582 acres of public land administered by the BLM in the Mojave Desert near the Nevada border 4.5 miles southwest of Primm, Nevada and 0.5 mile west of the Primm Valley Golf Club, which is located just west of the Ivanpah Dry Lake. Access to site is from the Yates Well Road Interchange on Interstate 15 (I-15) via Colosseum Road. See **Project Description Figure 1 –** Regional Setting and **Project Description Figure 2 –** Local Setting, below. (Ex. 300, p. 3-3.)

2. Project Construction and Operation

Project construction will take place over approximately 48 months with an average and peak workforce of 474 and 959, respectively, of construction craft people, supervisory, support, and construction management personnel on-site during construction. The peak construction site workforce level is expected to occur in Month 32. (Ex. 1, § 2.2-15.), There will be an estimated 90 full time positions at the completion of construction. Development and construction is expected to cost approximately $1,100 million. Construction could begin during the fourth quarter of 2010 and be completed during the fourth quarter 2013. The facility will be operated 7 days a week, 14 hours per day.

ISEGS anticipates that construction would take place as follows: 1) the Construction Logistics Area; 2) Ivanpah 1 (the southernmost site) and other shared facilities; 3) Ivanpah 2 (the middle site); and 4) Ivanpah 3 (the northernmost plant on the north). It is possible, however, that the order of

construction may change. The shared facilities will be constructed in connection with the first plant construction, whether it is Ivanpah 1, 2, or 3. The applicant has estimated the overall durations of grading at the 3 sites and common construction logistics area as follows:

- *Ivanpah 1 and Common Construction Logistics Area* - Total of 4 - 5 months
- *Ivanpah 2* - Total of 3 - 4 months; and
- *Ivanpah 3* - Total of 5 months

Project construction would be performed in accordance with plans and mitigation measures that would assure the project conforms with applicable LORS

3. Solar Field, Power Generation Equipment and Process

The proposed ISEGS project would be a development of three solar concentrating thermal power plants, which are comprised of fields of heliostats (elevated mirrors guided by a tracking system) focusing solar energy on boilers located on centralized power towers. Each heliostat tracks the sun throughout the day and reflects the solar energy to the receiver boiler. In each plant, one Rankine-cycle reheat steam turbine receives live steam from the solar boilers and reheat steam from the solar reheater.

Each heliostat would be configured with two mirrors hung in the portrait position. Each mirror would be 7.2 feet high by 10.5 feet wide, providing a reflective surface of 75.6 square feet (7.04 m²) per mirror or 14.08 m² per heliostat. The overall height of the heliostats would be about 12 feet and would be connected with communication cables strung aboveground between each heliostat which will transmit signals from a computer-programmed aiming control system that would direct the movement of each heliostat to track the movement of the sun. (Ex. 300, p. 3.5.)

Heliostats in the northern section of the heliostat array have the highest solar collection efficiency because the sun is predominantly in the southern horizon, and they have the most direct reflection angle to the power towers (most perpendicular to the face of the mirror as it reflects to the power tower). Conversely, heliostats in the southern section of the heliostat array have the lowest solar collection efficiency. The eastern sector of heliostats is more valuable than the western sector because afternoon energy collection during on-peak utility hours, is more valuable than morning energy collection during partial-peak or off-peak hours. In consideration of the relative efficiency of heliostats

depending on their orientation to the power tower, the applicant indicated that the number of heliostat rows increased from least to greatest according to this efficiency in order of southern, western, eastern and northern sectors respectively. (Ex. 300, p. 3-4.)

The heliostats would normally travel by day within the range of the stowed position with the mirrors facing vertically upwards to the track position at some angle higher than facing horizontally. At night, the heliostats would normally be maintained in the stowed position. Approximately every 2 weeks, the mirror would travel from the stowed to the wash position for night-time mirror washing with the mirrors facing horizontally. Daily positioning of the heliostats would occur as follows:

- At dawn, when likely all heliostats would be moved from stowed to track position to begin reflecting solar energy to the receiver/boiler;
- During mid-day, when some heliostats would be returned to the stowed position to not exceed solar energy capacity limits of the receiver/boiler;
- During late-afternoon or evening, when the stowed heliostats would be returned to track position to increase solar energy directed to the receiver/boiler as the sun's position begins to lower in the western horizon and be less optimal for energy production;
- At nightfall, when all heliostats would be returned to the stowed position or to the wash position for mirror washing at a frequency of about once every two weeks. (Ex. 300, p. 3.5.)

The number of heliostats proposed (53,500 for Ivanpah 1, 60,000 each for Ivanpah 2 and 3) represents the maximum number of heliostats that would be constructed; however, all of them may not be constructed. (Ex. 300, p. 3.5; Ex. 315, p. 2-7.)

The solar power towers are metal structures designed specifically to support the boiler and efficiently move high-quality steam through a steam turbine generator (STG) at its base. The overall height of the power tower would be approximately 459 feet high, consisting of a 393-foot (120 meters) high support structure, and a 66-foot (20 meters) high receiving boiler (which sits on top of the support structure), which includes the added height for an upper steam drum and protective ceramic insulation panels. Additionally, a Federal Aviation Administration (FAA)-required lighting and a lightning pole would extend above the top of the towers by approximately 10 feet. The height of the power towers allows heliostats from significant distances to accurately reflect sunlight to the

receiving boiler. The receiving boiler is a traditional high-efficiency boiler positioned on top of the power tower. The boiler converts the concentrated energy of the sun reflected from the heliostats into superheated steam. The boiler's tubes are coated with a material that maximizes energy absorbance. The boiler has steam generation, superheating, and reheating sections and is designed to generate superheated steam at a pressure of 160 bars and a temperature of 550 degrees Celsius (°C).

Each solar power plant (Ivanpah 1, 2 and 3) would have a power block located in the approximate center of the power plant area. The power block would include a solar power tower, a receiver boiler, an STG set, air-cooled condensers, and other auxiliary systems.

Each of the three power plants includes a partial-load, natural gas-fired steam boiler, which would be used for thermal input to the turbine during the morning start-up cycle to assist the plant in coming up to operating temperature more quickly. The boiler would also be operated during transient cloudy conditions, in order to maintain the turbine on-line and ready to resume production from solar thermal input, after the clouds pass.

The solar field and power generation equipment are started up each morning after sunrise and insolation build-up, and shut down in the evening when insolation drops below the level required to keep the turbine on line. The natural gas-fired boilers would not be big enough to allow operation for sustained periods of reduced sunlight, i.e., on cloudy days or at night.

4. Water Demand and Source of Supply

The facilities would require a water source to support operations, including process water consisting of make-up water for the steam system and wash water for the heliostats, and potable water for domestic water needs. Groundwater would be supplied from one of two wells that would be constructed at the northwest corner of Ivanpah 1, just outside the perimeter fence but within the construction logistics area. Each of the three power blocks would be connected to the groundwater wells by underground water pipelines. The Applicant estimates project water consumption would not exceed a maximum of 100 acre-feet per year (AFY) for all three solar plants combined, which would primarily be used to provide water for washing heliostats (mirrors) and to replace boiler feed water blow-down.

Because the BLM expressed concern that the two original proposed well locations would interfere with monitoring and regulation of the Primm Valley Golf Club Colosseum wells, the applicant relocated the proposed wells 4,250 feet south of their original location to the northwest corner of Ivanpah 1. This would eliminate the need for a separate access road and minimize land disturbance. In addition to supply wells, a monitoring well would be installed between the Ivanpah supply wells and the Primm Valley Golf Club wells. (Ex. 300, p. 3.10.)

5. Water Treatment Systems

The quality of groundwater would be improved using a treatment system for meeting the requirements of the boiler make-up and mirror wash water. Water treatment equipment would consist of activated carbon filters, de-ionization media, and a mixed-bed polisher. Each power plant would have a 250,000 gallon raw water storage tank. Approximately 100,000 gallons would be usable for plant process needs and 150,000 gallons would be reserved for fire protection. Demineralized water would be stored in a 25,000-gallon demineralized water storage tank. Boiler feedwater make-up water will be stored in another 25,000-gallon tank. (Ex. 300, p. 3.10.)

6. Storm Water Management

The proposed project site is located on an alluvial fan that acts as an active stormwater conveyance between the Clark Mountain Range to the west and the Ivanpah Dry Lake to the east. In addition to receiving direct precipitation that results in stormwater runoff, rainfall within the mountains to the west passes through the proposed project site along a complex series of braided channels that are normally dry throughout the year.

This proposed stormwater design and management system generally relies on a Low-Impact Development (LID) design concept which attempts to minimize disruption to natural stormwater flow pathways.

In minimizing the areas of direct vegetation removal, where possible, natural vegetation would be left in place and undisturbed during construction activities. This is to be accomplished through the use of equipment selected to maximize slope-climbing capability, minimize width of footprint, minimize weight of equipment and ground pressure, and allow extended reach across multiple heliostat rows. In minimizing the areas of grading and leveling, grading would be conducted in areas where existing topography must be modified for installation and operations.

Providing for active storm water management in limited areas includes construction of erosion protection features, diversion channels, detention ponds, and culverts for road crossings. For the ISEGS, these systems would be limited to diversion channels around the power block areas, and installation of erosion protection and/or culverts at channel crossings along the long-term access roads. (Ex. 300, p. 3.15.)

7. Wastewater and Sludge

A septic system for sanitary wastewater would be located at the administration building/operations and maintenance area, located between Ivanpah 1 and 2. Portable toilets would be placed in the power block areas of each the three solar facilities and pumped by a sanitary service provider. Process wastewater from all equipment, including the boilers and water treatment equipment would be recycled. If necessary, a small filter/purification system would be used to treat project groundwater and provide potable water at the administration building. Any reject streams from water treatment would be trucked off site for treatment or disposal at either a Class I or II waste facility as appropriate. (Ex. 300, p. 3-17.)

8. Air Pollution Control

Air pollution emissions from the combustion of natural gas in the start-up boiler would be controlled using best available control technology. Each boiler would be equipped with low-Nitrogen Oxide (NOx) burners for NOx control. Carbon Monoxide (CO) would be controlled using good combustion practices such as burner and control adjustment based on oxygen continuous monitoring, operator training and proper maintenance. Particulate and Volatile Organic Compounds (VOC) emissions will be minimized through the use of natural gas as the fuel. To ensure that the systems perform correctly, continuous emission monitoring for NO_x and CO would be performed. The **Air Quality** section of this Decision includes complete information on emission control and monitoring. (Ex. 300, p. 3-9.)

9. Hazardous Waste Management

Several methods will be used to properly manage and dispose of hazardous wastes. Waste lubricating oil will be recovered and recycled by a waste oil recycling contractor. Chemicals will be stored in appropriate chemical storage facilities. Bulk chemicals will be stored in large storage tanks, while most other chemicals will be stored in smaller returnable delivery containers. All chemical storage areas will be designed to contain leaks and spills in concrete containment areas. The Applicant will have an approved Risk Management Plan

in place to deal with any potential problems related to the use and handling of hazardous waste. (Ex. 300, p, 3-18.)

10. Fire Protection

The fire protection system would be designed to protect personnel and limit property loss and plant downtime in the event of a fire. The primary source of fire protection water would be the 250,000 gallon raw water storage tank. An electric jockey pump and electric motor-driven main fire pump would be provided to increase the water pressure to the level required to serve all fire fighting systems. In addition, a backup diesel engine-driven fire pump would be provided to pressurize the fire loop if the power supply to the electric motor-driven main fire pump fails. (Ex. 300, p. 3-10.)

11. Transmission System Interconnection

Each of the power plants would have their own switchyard with a step-up transformer to increase the 13.8 kV generator output voltage to 115 kV. Each generator connects to the proposed SCE Ivanpah Substation through its switchyard and a dedicated 115 kV tie line. The ISEGS #1 115 kV generator tie line would be approximately 5,800 feet long and supported by single-pole structures. The ISEGS #2 and #3 generator tie lines would share the same poles for the last 1,400 feet of their routes before they interconnect to SCE's proposed Ivanpah Substation. The ISEGS #2 generator would connect to the proposed Ivanpah Substation through a 115kV, 3,900 feet-long single circuit generator tie line built with the last 1,400 feet merged with the ISEGS #3 generator tie line to create a 1,400 feet long, overhead double circuit line prior to entering the proposed Ivanpah Substation. The ISEGS #3 generator tie line would be an approximately 14,100 feet long, single circuit, 115 kV line and would merge into a 115kV double circuit with the ISEGS #2 generator tie line.

TThe proposed Ivanpah Substation would be owned and operated by Southern California Edison (SCE) and located in the common construction logistics area between Ivanpah 1 and 2. The proposed SCE Ivanpah substation would be about 850 feet by 850 feet and located on a little over 16 acres. The California Public Utilities Commission and the Bureau of Land Management are currently reviewing the proposed substation as part of the Eldorado-Ivanpah Transmission Project (see the CPUC's website at http://www.cpuc.ca.gov/Environment/info/ene/ivanpah/Ivanpah.html for additional information on that project).

In accordance with the Interconnection Agreement between the Applicant and SCE, the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV line would loop in and out through the proposed Ivanpah Substation to interconnect the project to the SCE transmission grid. This 115-kV line is currently aligned between the Ivanpah 1 and 2 sites along a northeast-southwest right-of-way. In order to accommodate the total anticipated 1,400 MW load generation by ISEGS and five other planned renewable energy generation projects in the region, the California Independent System Operator (California ISO) has identified approximately 36 miles of transmission line within California and Nevada that would need to be upgraded from 115 kV to 220 kV. SCE is in the process of developing a project to upgrade the transmission system, which includes removing the existing 115-kV transmission lines and constructing a new double-circuit 220-kV transmission line between the existing Eldorado Substation in Nevada and the proposed SCE Ivanpah Substation in California. (Ex. 300, p. 3-13.)

12. Telecommunication Facilities

The proposed SCE Ivanpah Substation would also require that new telecommunication infrastructure be installed to provide protective relay circuit and a supervisory control and data acquisition (SCADA) circuit, together with data and telephone services. The telecommunication path from Ivanpah Substation to the local carrier facility interface at Mountain Pass area consists of approximately eight miles of fiber optic cable to be installed overhead on existing poles and through new underground conduits to be constructed in the substation and telecom carrier interface point. This fiber optic route consists of two segments. The first segment is from Ivanpah Substation to Mountain Pass Substation using the existing Nipton 33-kV distribution line poles built along the transmission line corridor that crosses between Ivanpah 1 and 2. The second segment is from Mountain Pass Substation to the telecommunications facility approximately 1.5 miles away at an interface point to be designated by the local telecommunication carrier. The fiber cable would be installed on the existing 12-kV distribution line poles. (Ex. 300, p. 3-13 – 3-14.)

13. Facility Closure

The IGESP will be designed for an operating life of 50 years. Depending on maintenance factors, at an appropriate point beyond the designed operating life, the project will cease operation and close down. At that time, it will be necessary

to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts.

Although the setting for this project does not appear to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 50 years or more when the project ceases operation. Therefore, provisions must be made which provide the flexibility to deal with the specific situation and project setting at the time of closure. Facility closure will be consistent with laws, ordinances, regulations, and standards in effect at the time of closure. (Ex. 300. p. 3-18.)

14. Public Comment

No comments were received which raise a substantial new environmental issue requiring our response.

FINDINGS OF FACT

Based upon the evidentiary record, we find as follows:

1. BrightSource Energy, Inc., will own and operate the project, which will be located on approximately 3,582 acres of public land administered by the BLM in the Mojave Desert near the Nevada border 4.5 miles southwest of Primm, Nevada.

2. The project will have a nominal capacity rating of 370 MW.

3. The project site arrangement generally consists of three 459 feet power towers surrounded by approximately 173,500 heliostats.

4. The project will consume no more than 100-acre feet per year of groundwater

5. The ISEGS project will interconnect to the proposed SCE Ivanpah Substation via a 115-kV transmission line. That substation is the first point of connection for ISEGS.

6. The project and its objectives are adequately described by the relevant documents contained in the record.

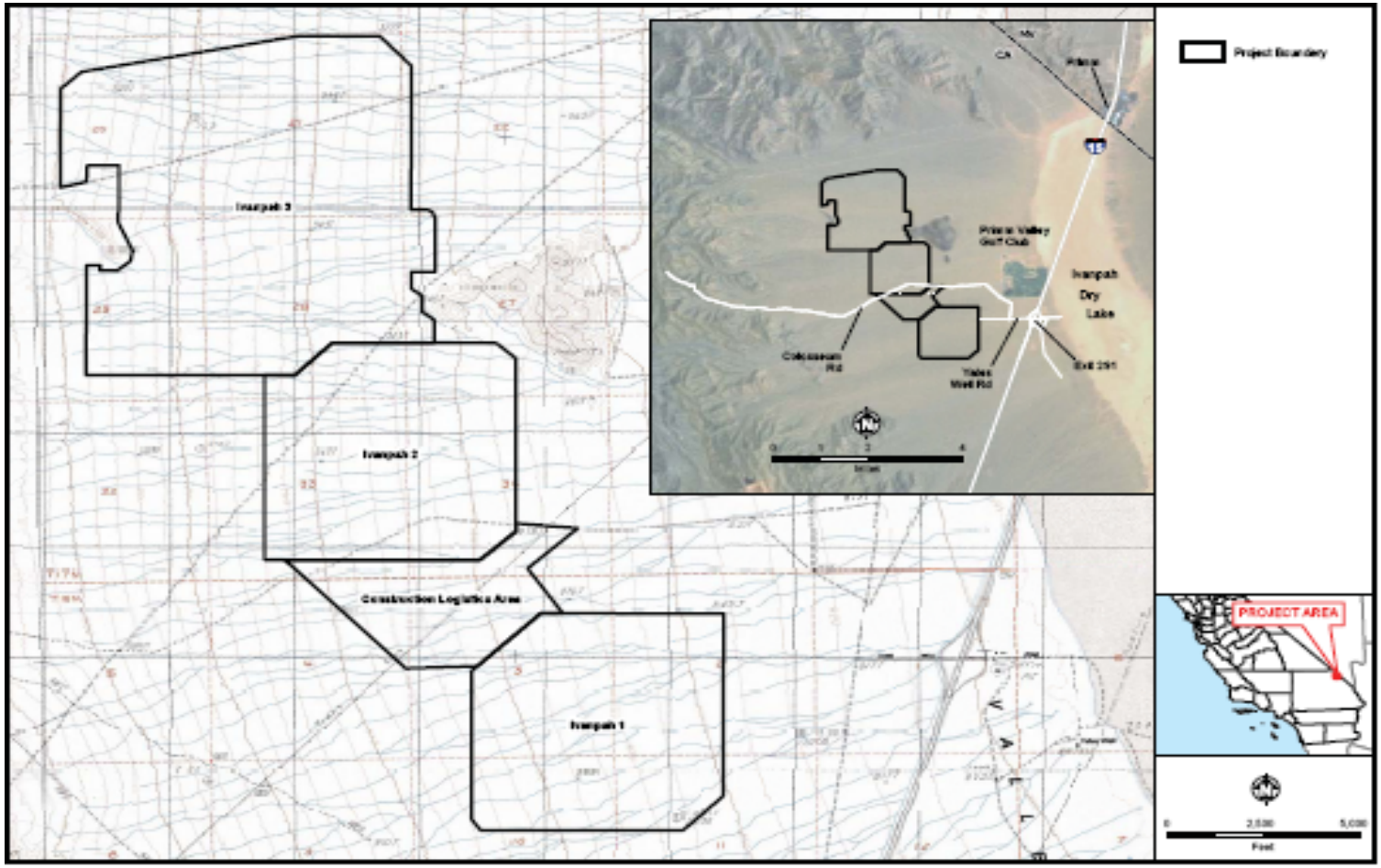
CONCLUSION OF LAW

1. The Ivanpah Solar Electric Generating Station Project is described at a level of detail sufficient to allow review in compliance with the provisions of both the Warren- Alquist Act and the California Environmental Quality Act.

PROJECT DESCRIPTION – Figure 1
Regional Setting

Source: Ex. 300.

PROJECT DESCRIPTION – Figure 2
Local Setting



Source: Ex. 300.

II. PROJECT ALTERNATIVES

The California Environmental Quality Act (CEQA) Guidelines and the Energy Commission's regulations require an evaluation of the comparative merits of a range of feasible site and facility alternatives which meet the basic objectives of the proposed project but would avoid or substantially lessen potentially significant environmental impacts. [Cal. Code Regs., tit. 14, §§ 15126.6(c) and (e); tit. 20, § 1765.]

The range of alternatives, including the "No Project" alternative, is governed by the "rule of reason" and need not include those alternatives whose effects cannot be reasonably ascertained and whose implementation is remote and speculative. [Cal. Code Regs. tit. 14, § 15126.6(f).] Rather, the analysis is necessarily limited to alternatives that the "lead agency determines could feasibly attain most of the basic objectives of the project." (*Id*.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

Energy Commission staff used the following methodology to analyze project alternatives for the Ivanpah Solar Electric Generation Station (ISEGS):

- identified basic objectives of the project and its potentially significant adverse impacts (which are discussed by topic in this Decision);
- identified and evaluated alternative sites to determine whether an alternative site would mitigate impacts of the proposed site and whether an alternative site would create impacts of its own;
- identified and evaluated technology alternatives, including alternative equipment and processes; and
- evaluated consequences of not constructing the project, i.e., the "No Project" alternative. (Ex. 300, p. 4-4.)

1. Project Objectives

For our analysis, we will consider the following objectives, a reduction and refinement of those proposed by the applicant:

- to safely and economically construct and operate a nominal 370 MW, renewable power generating facility in California capable of selling

competitively priced renewable energy consistent with the needs of California utilities;

- to locate the facility in areas of high solarity with ground slope of less than 5 percent;
- to complete the impact analysis of the project by the first quarter of 2010 so that if approved, construction could be authorized in 2010 and beyond. (Ex. 300, pp. 4-4 to 4-5.)

2. Project Impacts

In this Decision, the Commission has found the following significant impacts. Based on the evidence presented, the following impacts have been identified as issues of concern for the ISEGS project.

- **Biological Resources**. The creation of protected areas for the ten special-status plant species that could otherwise be directly impacted by construction of ISEGS, reduces most of the impacts to those plants to insignificant levels. Two plants (Mojave milkweed and desert pincushion), however, are distributed throughout the project site and cannot be protected by those means. Though Commission staff testified to a willingness to "accept a limited amount of uncertainty" regarding whether impacts to those two species would be mitigated, we, in an abundance of caution, find the potential impacts to be significant.
- **Land Use**. The contribution of ISEGS, in combination with the many other renewable energy projects proposed for the Ivanpah Valley and Mojave Desert, to the loss of desert lands, is cumulatively significant. Lands formerly available for multiple uses—habitat, grazing, recreation, and open space—would no longer be available for those uses once a power plant is constructed.
- **Traffic and Transportation**. Neither construction nor operation of the ISEGS project would have a significant impact on the local or regional road network, except for northbound Interstate 15 (I-15) on Friday afternoons and evenings between noon and 10 p.m. Project related vehicle trips occurring during that time window contribute to a significant cumulative impact by adding traffic to an already overloaded and congested I-15 that is operating at Level of Service F and result in an unmitigable impact.
- **Transmission Systems Engineering**. For the power grid to accommodate the generation from ISEGS, the System Impact Study indicates that it is necessary to replace an approximately 36-mile portion of the Eldorado – Ivanpah leg of the existing Eldorado-Baker-Cool Water–Dunn Siding-Mountain Pass 115 kV transmission line and with a new 36-mile long, 220 kV double circuit transmission line. In doing so, special-status plant species habitat may be lost due to construction activities. That loss would be a

significant impact. At this point, lacking precise information on the location of transmission line towers and the methods of construction, it cannot be determined whether it is possible to avoid or mitigate the potential impacts. Without that information, we assume that the impact is significant.

- **Visual Resources**. The ISEGS project would result in the installation of a large, industrial facility in a highly visible and scenic area of the Mojave Desert. We find significant visual impacts from several Key Observation Points in the Ivanpah Valley, Clark Mountains, and along I-15.

This alternatives analysis focuses on the consideration of these impacts and the extent to which they could be reduced or eliminated with use of alternatives.

3. Alternative Sites

Eight site alternatives are evaluated and presented in Commission staff's testimony. Their locations relative to the proposed project are depicted on **Alternatives Figure 1**.

a. Siberia East alternative

This site, also the site of a separate application to BLM for a solar power facility of up to 1,600 MW, is approximately 8.5 miles southeast of the town of Ludlow and immediately west of National Trails Highway (Route 66). Interstate 40 is located approximately 5 miles north of this site. The site is on BLM managed lands.

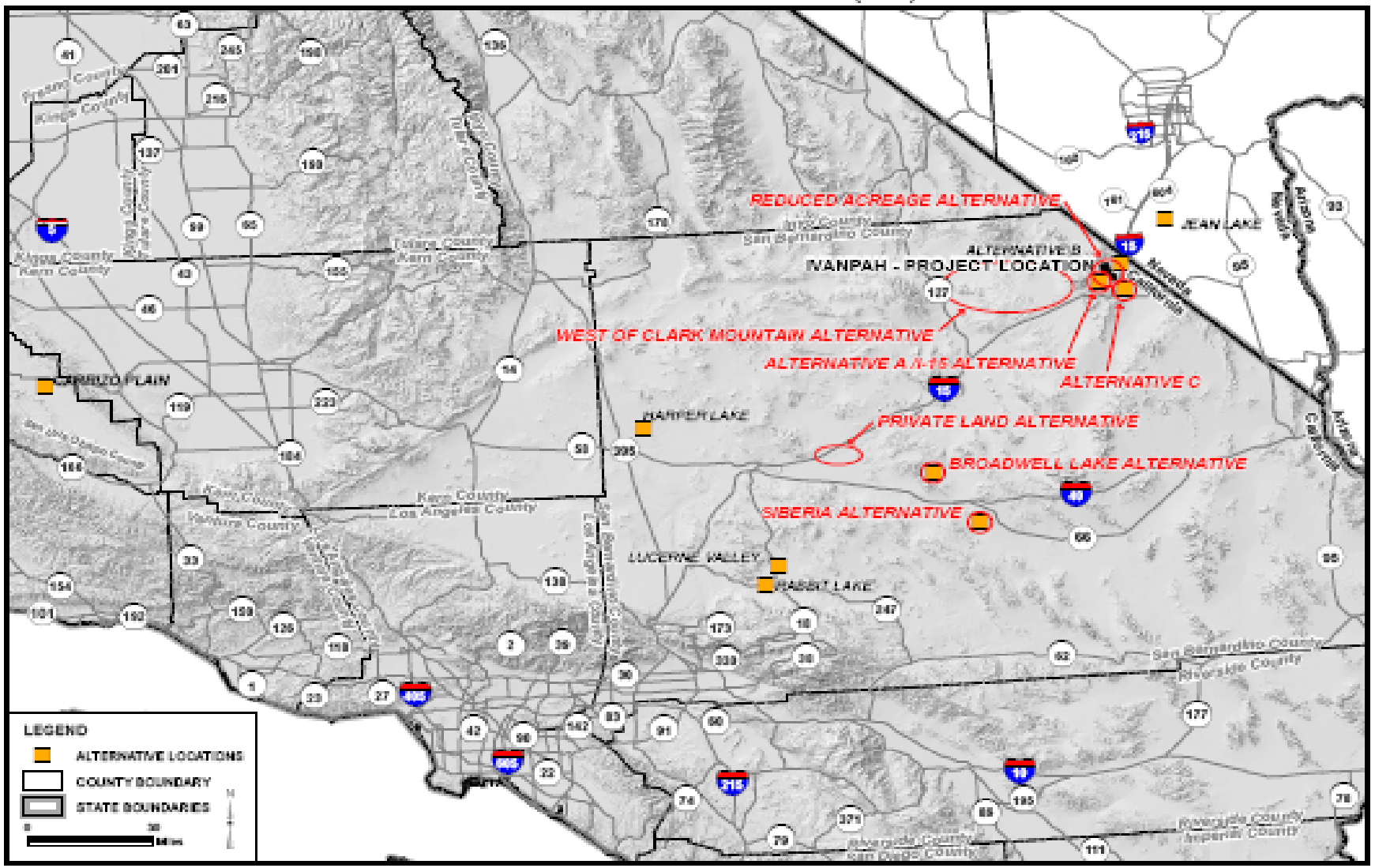
This alternative would have impacts similar to the proposed ISEGS site at Ivanpah Basin for air quality (operational impacts and most construction impacts), hazardous materials, noise & vibration, visual resources, public health & safety, transmission line safety and nuisance, waste management, worker safety and fire protection, facility design, power plant design, efficiency and reliability. The limited information regarding the site, its vegetation, and surveys of nearby similar areas suggest that Biological Resource impacts would be similar to those at ISEGS.

The Siberia East alternative would be less preferred (have greater impacts) than the proposed ISEGS site for air quality (commuting impacts during construction impacts only), socioeconomics, geology, paleontology and minerals, and transmission system engineering. The Siberia East alternative would be

preferred (have fewer impacts) than the proposed ISEGS site at Ivanpah Basin for land use, recreation, and traffic and transportation. (Ex. 300, pp. 4-12 to 4-15.)

ALTERNATIVES - FIGURE 1

ISEGS - Locations of Alternatives Eliminated (in red)



b. Broadwell Lake alternative

The Broadwell Lake site would be located on BLM land, approximately 8.5 miles north northwest of Interstate 40 at Ludlow. It is approximately 1.5 miles east of the Kelso Dunes Wilderness, approximately 7 miles north-northwest of the Bristol Mountains Wilderness, and approximately 1 mile west of the Broadwell Dry Lake. National Trails Highway (Route 66) and Interstate 40 are located approximately 8.5 miles to the south. The site is said to be under consideration for inclusion in a future national monument.

This alternative would have similar impacts as the proposed ISEGS site for **Air Quality** (operation and most construction impacts), **Hazardous Materials Management, Visual Resources, Land Use, Recreation, Noise and Vibration, Public Health, Transmission Line Safety and Nuisance, Waste Management, Worker Safety and Fire Protection, Facility Design, Power Plant Efficiency and Power Plant Reliability. Biological Resources** impacts would likely to be similar to those of ISEGS.

The Broadwell Lake alternative would be less preferred than the proposed ISEGS site for **Air Quality** (for construction commuting only), **Socioeconomics** and **Environmental Justice**, **Geology, Paleontology and Minerals,** and **Transmission System Engineering**. The Broadwell Lake alternative would be preferred to the proposed Ivanpah basin site for traffic and transportation. (Ex. 300, pp. 4-15 to 4-19.)

c. Private Land alternative

There are limited areas where undeveloped contiguous private land parcels with the appropriate slope and solarity features are potentially available. No such parcels with a single owner were found; multiple owners, some who may not be willing to sell at all or for a reasonable price. One of these areas is the triangular land area east of Barstow, bounded by I-15 on the north, I-40 on the south, and BLM land on the east. It includes the towns of Daggett and Yermo (both about 12 miles east of Barstow), the Barstow-Daggett Airport, and the Marine Corps Logistics Base (MCLB). The Mojave River passes through the northern portion of the triangle, and its floodplain ranges from about 2,000 feet to one mile wide. The river parallels I-15 on a northeasterly trend.

The Private Land alternative would have impacts similar to the proposed ISEGS site at Ivanpah Basin for **Air Quality, Hazardous Materials Management, Recreation, Public Health, Socioeconomics, Transmission Line Safety And Nuisance, Waste Management, Worker Safety and Fire Protection, Facility Design, Power Plant Efficiency, Geology And Paleontology, And Power Plant Reliability.** It would be preferred to the proposed ISEGS site at Ivanpah Basin for **Biological Resources, Visual Resources,** and **Traffic and Transportation**. The alternative would be less preferred than the proposed ISEGS site for **Cultural Resources**, **Land Use** (including agriculture), **Noise**, and **Transmission System Engineering**. While impacts to soils and water from alternative would be similar to those at the ISEGS site, it is uncertain if there is groundwater available at the alternative site. (Ex. 300, pp. 4-19 to 4-43.)

d. I-15 alternative

Suggested by intervenors Sierra Club and Western Watersheds Project, this alternative would move the northern portion of ISEGS (Ivanpah 3) to the area between Ivanpah 1 and the I-15 freeway. Intervenor Sierra Club provided testimony that the I-15 Alternative would reduce impacts to desert tortoise and rare plants. However, staff's testimony does not support Sierra Club's assertion, but instead suggests that the I-15 Alternative would result in similar impacts to desert tortoise and rare plants as the proposed project. The reduced separation from I-15 will increase the duration of visual impacts to motorists, increasing already significant, unmitigable impacts and leaving other impacts unchanged. (Ex. 300, pp. 4-43 to 4-49.)

e. Ivanpah Site A alternative

Ivanpah Site A is located adjacent to and southwest of the proposed ISEGS site in the Ivanpah Valley. It overlaps the ISEGS site in a portion of BLM sections totaling approximately one square mile, and it also includes one section (Section 16) of state land under the jurisdiction of the California State Lands Commission.

Due to their proximity and similar site characteristics between the ISEGS site and the Ivanpah Site A, impacts of the Ivanpah Site A would be similar to the proposed project. However, Ivanpah Site A would be closer to I-15 and to the Mojave National Preserve, resulting in increased visibility from these sensitive areas. A longer interconnection with the Kern River gas transmission line would be required, thereby increasing impacts associated with the linear connection, including ground disturbance. (Ex. 300, pp. 4-49 to 4-50.)

f. Ivanpah Site C alternative

The Ivanpah Site C alternative is located southeast of the proposed ISEGS site, East and South of I-15 and north of Nipton Road (Highway 164) and the Mojave Desert Preserve. It would be bordered by the Ivanpah Dry Lake to the east. Site characteristics are similar to those of the ISEGS site. Given the proximity of the sites, it is reasonable to assume that they have similar habitat characteristics. The transmission interconnection would also be similar to that at the ISEGS site. Ivanpah Site C would border the Mojave Desert Preserve to the south. The site is located in a Desert Wildlife Management Area, established to protect denser populations of desert tortoise. Longer interconnections with the Kern River gas transmission line and the SCE transmission line would be required due to the site's greater distance from these utilities.

Due to their proximity of the proposed ISEGS site and the Ivanpah Site C, most impacts of the Ivanpah Site C alternative would be similar to those of the proposed site. However, Ivanpah Site C would be more visible from I-15 and Nipton Road increasing the visual impacts to motorists on I-15. Also, because Ivanpah Site C is located in a Desert Wildlife Management Area, the potential for impacts to desert tortoise may be greater. Longer interconnections with the Kern River gas transmission line and the SCE transmission line would be required, with associated increased ground disturbance and visual impacts. The greater proximity to the Ivanpah Dry Lake could increase cultural resource impacts as more cultural artifacts may be present. (Ex. 300, p. 4-51.)

g. West of Clark Mountain alternative

The National Parks Conservation Association and National Park Service requested consideration of a site west of Clark Mountain was considered as a means of reducing visual impacts to the Mojave National Preserve. Two broad valleys west of Clark Mountain offer slopes consistent with solar requirements: the Silurian Valley (north of Baker, which is used by the Army for desert warfare training based in the National Training Center at Fort Irwin) and the Shadow Valley immediately west of the Clark Mountain Range. The Silurian Valley is bisected by State Highway 127, which is a major access road for Death Valley National Park.

Much of the land immediately west of the Clark Mountain Range in Shadow Valley is located in the Eastern Mojave Desert Tortoise Recovery Unit and within a Desert Wildlife Management Area and therefore, while it may meet the site

selection criteria, it would not be viable as an alternative to the ISEGS site. Further east of Shadow Valley, among the Shadow Mountains, the topography is such that a contiguous 400 MW solar thermal power plant would not have the suitable ground slope requirement and is therefore not viable for solar energy projects. Suitable land for a solar project exists in the Silurian Valley; however, existing solar and wind applications have already requested use of this land in a total amount of nearly 40,000 acres. West of the Silurian Valley is the Fort Irwin National Training Center, which is not considered to be available for a large solar project. (Ex. 300, p. 4-52.)

Lacking available land, therefore, the West of Clark Mountain alternative is not feasible.

h. Reduced Acreage alternative

The Reduced Acreage alternative addressed concerns about protecting the densest concentrations of sensitive plants on the ISEGS site. It would reduce the ISEGS footprint by an unspecified amount by avoiding development in those densest areas, avoiding the need to transplant the plants. (Ex. 300, pp. 4-52 to 4-53.)

With the Applicant's amendment of its project to remove portions of Ivanpah 3 considered most sensitive and our imposition of Condition **BIO-18**, this alternative has been effectively made a part of the ISEGS project.

4. Generation Technology Alternatives

Although alternative solar generation technologies would achieve most of the project objectives, each has different environmental or feasibility concerns.

a. Parabolic Trough Technology

A parabolic trough system converts solar radiation to electricity by using sunlight to heat a fluid, such as oil, which is then used to generate steam. The plant consists of a large field of trough-shaped solar collectors arranged in parallel rows, normally aligned on a north-south horizontal axis.

A solar trough power plant generally requires land with a grade of less than 1 percent. On average, 5 to 8 acres of land are required per MW of power

generated. A parabolic trough power plant would include the following major elements:

- *Parabolic Trough Collectors*. The parabolic trough collectors rotate around the horizontal north/south axis to track the sun as it moves through the sky during the day. Reflectors, or mirrors, focus the sun's radiation on a linear receiver/heat collection element, which is located along the length of the collector.

- *Solar Boiler*. Solar boilers are designed differently than conventional gas-fired boilers in that they are fueled with hot oil instead of hot gases. This design is similar to any shell and tube heat exchanger in that the hot heat transfer fluid is circulated through tubes and the steam is produced on the shell side.

- *Heat Transfer Fluid Oil Heater*. Due to the high freezing temperature of the solar field's heat transfer fluid (54°F), to eliminate the problem of oil freezing, an oil heater would be installed and used to protect the system during the night hours and colder months.

Approximately 2,000 to 3,200 acres of land would be required for a 400 MW solar trough power plant, resulting in a permanent loss of natural desert habitat similar to the habitat loss created by the proposed solar tower technology. If the solar trough technology were used at Ivanpah, somewhat greater acreage may be required because the proposed site is crossed by several desert washes. Parabolic troughs require a more level ground surface, so the entire solar trough power plant would be graded, removing all vegetation from the area. This results in a somewhat more severe effect on biological resources than the ISEGS project, which would not require grading over the entire site and would periodically trim, rather than remove, vegetation where possible.

The size and height of the solar trough mirrors (each approximately 28 feet high) would cause visual impacts from I-15 and Ivanpah Dry Lake. The plant would also be visible from the Primm Golf Course, immediately east of the ISEGS site and slightly elevated. While the solar trough technology would not have the approximately 459-foot-tall solar power towers, the number of solar troughs and the large acreage required would still introduce prominent and reflective structures.

Solar trough plants require water to generate the steam that powers the turbines. The technology uses a closed-loop circulation that requires some boiler make-up water to replace water lost in the system. Water is also required to wash the mirrors for both types of technologies. If wet cooling were used, the cooling

towers would require approximately 600 acre-feet/year (AFY) per 100 MW of capacity. Dry cooling would use significantly less water, approximately 18 AFY per 100 MW.

Because of the extensive grading required for a solar trough plant, soil erosion could be more severe than that of the ISEGS project. The project would still require use of I-15 for commuting workers during both construction and operation.

The large land area needed for a solar trough power plant would likely be less than ISEGS, but more intensive in terms of ground disturbance. Because of the more intensive use of the land and the grading required to achieve a 1 percent grade, there could be more severe impacts to biological resources including vegetation, than would occur with the ISEGS facility. In addition, due to the large size of the power plant and the use of taller parabolic trough mirrors (approximately 28 feet high when at their maximum tilt) compared to the approximately 12 foot high heliostats for ISEGS, the visual impact could be greater, although the visual impact for ISEGS is significant and cannot be mitigated from some locations. Although it would likely be mitigated to a less than significant impact, the use of a heat transfer fluid conveyed in miles of pipelines from the parabolic trough collectors to the solar boiler would create a potential for spill of a hazardous material into soil or water, a risk not present with ISEGS. Impacts to northbound I-15 traffic congestion on Friday afternoons and evenings would also not change, and would remain cumulatively considerable and significant during project construction and operation.

While solar trough technology is a viable renewable technology and would likely reduce the footprint of the project on the order of 25 to 35 percent, it would not significantly reduce the impacts of the ISEGS. (Ex. 300, pp. 4-55 to 4-56.)

b. Stirling Dish Technology

The Stirling dish technology converts thermal energy to electricity by using a mirror array to concentrate and focus sunlight on the receiver end of a Stirling engine. The curved dishes that focus the sun's energy are approximately 45 feet tall. The internal side of the receiver heats hydrogen gas, which expands. The pressure created by the expanding gas drives a piston, crankshaft, and drive shaft. The drive shaft turns a small electricity generator. The entire energy conversion process takes place within a canister the size of an oil barrel. The generation process requires no water, and the engine does not produce

emissions as no combustion takes place. Each concentrator consists of one Stirling engine mounted above one mirror array.

Based upon two proposed solar thermal power plants using Stirling dish technology currently being considered by BLM and the Energy Commission, the Calico Solar Project and the Imperial Valley Solar Project (formerly known as SES Solar 1 and SES Solar 2, respectively). The land use per MW of installed capacity is about the same as ISEGS, and thus would require about the same footprint as ISEGS. Site preparation involves sinking a cement base with an embedded pedestal to support the dish (SES 2008). Each Stirling dish generates 25 kilowatts of power, so 16,000 dishes would be required to generate 400 MW.

The land area required for a 400 MW Stirling engine power plant is similar to that required for the proposed ISEGS project. However, it is not necessary to grade the entire parcel as only the 18-inch diameter pedestal of the Stirling engine requires level ground. It would still be necessary to grade permanent access roads between every two rows of Stirling engines due to the need for regular washing of the mirrors. This grading would cause removal of vegetation. Additionally, because the proposed Ivanpah site is crossed by several desert washes, the installation of 16,000 Stirling engines could require a larger total acreage of land, resulting in a greater loss of habitat.

Due to the size and height of the Stirling mirrors, impacts to visual resources would be similar or greater to those of ISEGS. While the Stirling engine technology would not require the approximately 459-foot-tall solar power towers, the 16,000 Stirling engines would introduce an industrial character and transformation of the site with the 45 foot tall engines. There would be less grading for the Stirling engine structures, but the numerous access roads required for cleaning the energy systems would create a high contrast between the disturbed area and its surroundings. The project would still require use of I-15 for commuting workers during both construction and operation.

The large area needed for a Stirling dish power plant would be comparable to the land requirement for the ISEGS power plant. Although grading requirements for the Stirling engines and solar concentrators are relatively small, like ISEGS, grading for access roads would be extensive because access roads are required for every other row of Stirling engines. For these reasons, recreation and land use, and biological resources impacts would be similar to those of the ISEGS facility. In addition, due to the extent of the facility and the height of each concentrator, visual impacts would not be significantly reduced by this alternative

and may be greater considering that the 45-foot high solar concentrators would be more pronounced than the approximately 12-foot high heliostats. However, the Stirling dish technology does not require power towers or a turbine. Impacts to northbound I-15 traffic congestion on Friday afternoons and evenings would also not change, and would remain cumulatively considerable and significant during project construction and operation. (Ex. 300, pp. 4-57 to 4-58.)

c. Linear Fresnel Technology

A solar linear Fresnel power plant converts solar radiation to electricity by using flat moving mirrors to follow the path of the sun and reflect its heat on the fixed pipe receivers located about the mirrors. During daylight hours, the solar concentrators focus heat on the receivers to produce steam, which is collecting in a piping system and delivered to steam drums located in a solar field and then transferred to steam drums in a power block.
In general, the linear Fresnel technology requires 4 – 5 acres of land per MW of power generated, which is about half the land required by the other solar technologies. A 400-MW solar linear Fresnel field would require approximately 1,600 – 2,000 acres of land.

Each row-segment is supported by large hoops that rotate independently on metal castors. Rotation of the reflectors would be driven by a small electrical pulse motor. Reflectors are stowed with the mirror aimed down at the ground during the night. The major components are:

- *CLFR Solar Concentrator*. A solar Fresnel power plant would use Ausra's CLFR technology which consists of slightly curved linear solar reflectors that concentrate solar energy on an elevated receiver structure. Reflectors measure 52.5 by 7.5 feet. There are 24 reflectors in each row. A line is made up of 10 adjacent rows and operates as a unit, focusing on a single receiver.

- *Receiver Structure*. The receiver structure is approximately 56 feet tall. It would carry a row of specially coated steel pipes in an insulated cavity. The receiver would produce saturated steam at approximately 518°F from cool water pumped through the receiver pipes and heated. The steam would drive turbines and produce electricity.

Though the Fresnel solar technology would require less acreage per MW of electricity produced than the ISEGS power tower plant, the Fresnel technology would still require the removal of approximately 1,600 – 2,000 acres of desert habitat. The mirrors are placed close together, so grading of the entire 1,600

acres would likely be required. Also, because the proposed Ivanpah site location is crossed by several desert washes, the engineering of the Fresnel siting may require a larger acreage than would otherwise be expected.

The Fresnel receiver structure is approximately 56 feet high and is required for every 10 rows of mirrors. Additionally, steam drums about 58 feet tall would be required to collect the steam from the receiver structure. The steam turbine generators would be roughly 60 feet tall and the air-cooled condensers, 115 feet tall. Due to the height of the many project facilities, impacts to visual resources would be similar to those of the proposed ISEGS facility.

Linear Fresnel plants require water to generate the steam that powers the turbines. The technology uses a closed-loop circulation that requires some make-up water to replace water lost in the system. Water would also be required to wash the mirrors. If wet cooling were used, the cooling towers would require approximately 600 acre feet per year per 100 MW. Dry cooling would use significantly less water, approximately 12.3 acre feet per year per 100 MW (NRDC 2008b). The project would still require use of I-15 for commuting workers during both construction and operation.

Although the linear Fresnel technology would require grading of the entire project site, the plant would require only 1,600 – 2,000 acres, about half the acreage required by the ISEGS project to generate the same amount of power. While visual and ground disturbance impacts would be reduced due to the smaller footprint, the ground disturbance would be more intense within the project boundaries and the visual impacts of the solar field could be more pronounced when comparing the 56-foot high receivers to the approximately 12-foot high heliostats for ISEGS. Impacts to northbound I-15 traffic congestion on Friday afternoons and evenings would also not change, and would remain cumulatively considerable and significant during project construction and operation.

The Fresnel solar technology is a proprietary technology owned by Ausra, Inc. and could not be developed by BrightSource at the Ivanpah site. Therefore, while this technology offers environmental advantages in terms of a footprint that could be only about half the size of ISEGS, it is not available to the ISEGS Applicant, and therefore is not feasible at the Ivanpah site. (Ex. 300, pp. 4-58 to 4-60.)

d. Solar Photovoltaic Technology – Utility Scale

A solar photovoltaic (PV) power generation facility would consist of PV panels that would absorb solar radiation and convert it directly to electricity. The land requirement varies from approximately 3 acres per MW of capacity for crystalline silicon to more than 10 acres per MW produced for thin film and tracking technologies. Therefore, a nominal 400 MW solar PV power plant would require between 1,600 and 4,000 acres.

Water for electricity generation. Some water may be required to wash the solar panels to maintain efficiency, approximately 2-10 acre feet per year (AFY) of water may be required for a 100 MW utility solar PV installation or 8 - 40 AFY for a 400 MW installation. Solar PV arrays and inverters would be approximately 15 to 20 feet high; however, some components of the solar PV facility, such as collector power lines or a transmission interconnection may be significantly taller (SLO 2009).

The size and height of the solar PV arrays would likely be visible from nearby regions, such as I-15 and the Ivanpah Dry Lake due to the large size of the solar PV facility. The facility would also be visible from the Primm Golf Course, immediately east of the ISEGS site and slightly elevated. The large number of solar PV arrays, access roads, and interconnection power lines required for a 400 MW solar facility would introduce prominent industrial features; however, the solar PV technology would not introduce components as tall as the approximately 459-foot-tall solar power towers or the cooling towers as with the solar power tower technology. Additionally, because most PV panels are black to absorb sun, rather than mirrored to reflect it, glare would not be created as with the mirrors required for the power tower, Fresnel, and trough technologies.

Because the solar PV technology does not require any water for cooling or steam generation, the technology uses less water than solar concentrating technologies. Water would be required for washing the solar PV arrays. Approximately 20 AFY would be required instead of the approximately 78 AFY for the solar power tower technology.

More extensive grading would be required for a solar PV facility than a solar power tower facility. Because solar PV facilities require land with only 3 percent slope and the solar panels are grouped more densely together, it is likely that more grading would be required for a solar PV facility than for a solar power tower facility to establish man-made stormwater conveyance channels. This

would not achieve the low-impact development approach as is proposed with ISEGS that would minimize grading and would largely avoid disturbance to the ephemeral drainages. Additionally, many miles of permanent access roads would be required for washing and maintenance of the solar panels. The extensive grading would likely create greater erosion concerns than those of the ISEGS project. The project would still require use of I-15 for commuting workers during both construction and operation.

The large land area required for PV development would result in similar impacts to recreation, **Land Use**, **Biological Resources**, and likely greater impacts to **Soil and Water Resources** as those of the ISEGS facility. In addition, the large facility would be highly visible and would still have unavoidable significant adverse visual impacts. Impacts to northbound I-15 traffic congestion on Friday afternoons and evenings would also not change, and would remain cumulatively considerable and significant during project construction and operation.

While utility scale solar PV technology is a viable renewable technology, its use would not reduce major impacts of the ISEGS facility because of its visual prominence, the extent of land and access roads required, and the more extensive grading and storm water management system required. (Ex. 300, pp. 4-60 to 4-62.)

e. Distributed Solar Technology

Distributed solar generation is generally considered to use PV technology, but at slightly larger scales, distributed solar can also be implemented using solar thermal technologies.

Rooftop Solar Systems. A distributed solar photovoltaic (PV) alternative would consist of PV panels that would absorb solar radiation and convert it directly to electricity. The PV panels could be installed on residential, commercial, or industrial building rooftops or in other disturbed areas. In order to be a viable alternative to this project, there would have to be a sufficient number of panels to provide 400 MW of capacity.

California currently has 441 MW of distributed solar PV systems which cover over 40 million square feet. During 2008, 158 MW of distributed solar PV was installed in California, doubling the amount installed in 2007 (78 MW). While small distributed solar PV systems are relatively common in California, large distributed solar PV installations are less so.

Distributed Solar Thermal Systems. Solar thermal technology, specifically Concentrated Solar Power (CSP) technology, has also been adapted for use at distributed locations. This technology uses small, flat mirrors which track the sun and reflect the heat to tower-mounted receivers that boil water to create superheated steam.

Installations of 400 MW distributed solar PV would require between 40 to 120 million square feet. Distributed solar PV is assumed to be located on already existing structures or disturbed areas so little to no new ground disturbance would be required and there would be few associated biological impacts. Minimal grading or new access roads would be required and relatively minimal maintenance and washing of the solar panels would be required. It is unlikely that the rooftop solar PV alternative would create erosion impacts. Relatively large amounts of water would be required to wash the solar panels, especially with larger commercial rooftop solar installations; however, the commercial facilities would likely already be equipped with drainage systems. Therefore, the wash water would not contribute to runoff or to erosion.

Because most PV panels are black to absorb sun, rather than mirrored to reflect it, glare would not create visual impacts as with the power tower, Fresnel, and trough technologies. Additionally, the distributed solar PV alternative would not require the additional operational components, such as dry-cooling towers, substations, transmission interconnection, maintenance and operation facilities with corresponding visual impacts. Solar PV panels would be visible to passing residents and may be viewed by a larger number of people.

Building 400 MW of distributed solar PV would require an even more aggressive deployment of PV at more than double the historic rate of solar PV than the California Solar Initiative program currently employs. Increased incentives may be required to achieve this level of penetration.

While it is possible to achieve 400 MW of distributed solar PV, the Energy Commission's Intermittency Analysis Project Final Report assumes 3,100 MW of concentrated solar power in addition to 2,900 MW of solar PV, or a total of 6,000 MW of solar power. Achieving 6,000 MW of solar PV to provide the renewable energy required to meet the California Renewable Portfolio Standard requirements would be challenging so additional technologies, like solar thermal generation, are also necessary. Distributed solar must be viewed as a partner, not a competitor or replacement for utility scale solar. (Ex. 300, pp. 4-62 to 4-66.)

f. Alternative Renewable Technologies

Wind energy. Wind carries kinetic energy that can be utilized to spin the blades of a wind turbine rotor and an electrical generator, which then feed alternating current (AC) into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind's kinetic energy into electricity. A single 1.5-MW turbine operating at a 40 percent capacity factor generates 2,100 MWh annually. The technology is now well developed and can be used to generate significant amounts of power. There are now approximately 2,490 MW of wind being generated in California.

Wind turbines can create environmental impacts, such as:

- Wind energy requires between 5 and 17 acres per MW of energy created. As such a nominal 400 MW power plant would require between 2,000 and 6,800 acres. However, wind turbine "footprints" typically use only 5 percent of the total area, or approximately 100 to 340 acres for a 400-MW power plant.

- Erosion can be a concern in certain habitats such as the desert or mountain ridgelines. Standard engineering practices can be used to reduce erosion potential.

- Birds collide with wind turbines. Avian deaths, particularly raptors, are a significant concern depending on raptor use of an area.

- Wind energy can negatively impact birds and other wildlife by fragmenting habitat, both through installation and operation of wind turbines themselves and through the roads and power lines that are required.

- Bats collide with wind turbines. The extent of bat mortality depends on turbine placement and bat flight patterns.

- Visual impacts of wind turbines can be significant, and installation in scenic and high traffic areas can result in strong local opposition. Other impressions of wind turbines are that they are attractive and represent clean energy.

Approximately 2,000 to 6,800 acres of land would be required for a 400 MW wind electricity power plant. While wind plants would not necessarily impact the same types of wildlife and vegetation as the ISEGS solar power tower plant, the significant acreage necessary for a 400 MW wind plant would still cause significant habitat loss in addition to potentially significant impacts from habitat fragmentation and bird and bat mortality.

Wind turbines are often over 400 feet high for 2 MW turbines. As such, any wind energy project would be highly visible, which is of special concern in scenic areas. While wind electricity generation is a viable and important renewable technology in California, it would not reduce the large-scale ground disturbance and visual impacts associated with the ISEGS project. (Ex. 300, pp. 4-66 to 4-68.)

Geothermal energy. Geothermal technologies use steam or high-temperature water obtained from naturally occurring geothermal reservoirs to drive steam turbine/generators. There are vapor dominated resources (dry, super-heated steam) and liquid-dominated resources where various techniques are utilized to extract energy from the high-temperature water.

Geothermal plants account for approximately 5 percent of California's power and range in size from under 1 MW to 110 MW. Geothermal plants typically operate as base load facilities and require 0.2 to 0.5 acre per MW, so a 400 MW facility would require up to 200 acres. California is the largest geothermal power producer in the United States, with about 1,800 installed capacity; in 2007, 13,000 gigawatt hours of electricity were produced in California (CEC 2008). Geothermal plants provide highly reliable base load power, with capacity factors from 90 to 98 percent.

Geothermal plants must be built near geothermal reservoir sites because steam and hot water cannot be transported long distances without significant thermal energy loss. Geothermal power plants are operating in the following California counties: Lake, Sonoma, Imperial, Inyo, Mono, and Lassen.

Geothermal generation is a commercially available technology and is important for California's renewable energy future because it provides base load power. However, it is limited to areas with geologic conditions resulting in high subsurface temperatures. Even in areas where such conditions are present, there have been concerns about the reliability and corrosiveness of the steam supply. Additionally, while the technology is available, there are not enough geothermal resources to provide the renewable energy required to meet the California Renewable Portfolio Standard requirements, so additional technologies, like solar thermal generation, would also be required. (Ex. 300, pp. 4-68 to 4-69.)

Biomass energy. Electricity can be generated by burning organic fuels in a boiler to produce steam, which then turns a turbine; this is biomass generation. Biomass can also be converted into a fuel gas such as methane and burned to generate power. Wood is the most commonly used biomass for power generation. Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing wastes, and construction and urban wood wastes. Several techniques are used to convert these fuels to electricity, including direct combustion, gasification, and anaerobic fermentation. Biomass facilities do not require the extensive amount of land required by the other renewable energy sources discussed, but they generate much smaller amounts of electricity.

Currently, nearly 19 percent of the state's renewable electricity derives from biomass and waste-to-energy sources. Most biomass plant capacities are in the 3- to 10-MW range and typically operate as base load capacity. The average size of a sales generation biomass plant is 21 MW. Unlike other renewables, the locational flexibility of biomass facilities would reduce the need for significant transmission investments. Solid fuel biomass (555 MW) makes up about 1.75 percent of the state’s electricity, and landfill gas generation (260 MW) makes up about 0.75 percent. Existing landfills not now producing electricity from gas could add a maximum of about 170 MW of new generation capacity.

Generally, small amounts of land are required for biomass power facilities; however, a biomass facility should be sited near a relatively large source of biomass in order to minimize the cost of bringing the biomass waste to the facility. Operational noise impacts may be a concern, originating from truck engines as a result hauling operations coming from and going to the facility repeatedly on a daily basis. Other operations of the biomass facilities, while internal to the main structure, can result in increased noise due to the material grinding equipment.

The emissions due to biomass fuel-fired power plant operation are generally unavoidable. Direct impacts of criteria pollutants could cause or contribute to a violation of the ambient air quality standards. Significant impacts can potentially occur for PM10 and ozone because emissions of particulate matter and precursors and ozone precursors would contribute to existing violations of the PM10 and ozone standards. Biomass/biogas facility emissions could also adversely affect visibility and vegetation in federal Class I areas or state wilderness areas, which would significantly deteriorate air quality related values in the wilderness areas. Toxic air contaminants from routine operation would also cause health risks that could locally adversely affect sensitive receptors.

Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW) and could not meet project objectives. Biomass facilities also generate significant air emissions and require numerous truck deliveries to supply the plant with the waste. Also, in waste-to-energy facilities, there is some concern regarding the emission of toxic chemicals, such as dioxin, and the disposal of the toxic ash that results from biomass burning. (Ex. 300, pp. 4-69 to 4-70.)

Tidal energy. The oldest technology to harness tidal power for the generation of electricity involves building a dam, known as a barrage, across a bay or estuary that has large differences in elevation between high and low tides. Water retained behind a dam at high tide generates a power head sufficient to generate electricity as the tide ebbs and water released from within the dam turns conventional turbines.

Wave energy. Wave power technologies have been around for nearly 30 years. Setbacks and a general lack of confidence have contributed to slow progress towards proven devices that would have a good probability of becoming commercial sources of electrical power.

The highest energy waves are concentrated off the western coasts in the 40^{o} to 60^{o} latitude range north and south. Additional costs from permitting and environmental assessments also make wave energy problematic. Nonetheless, wave energy is likely to increase in use within the next 5 to 10 years.

The total power of waves breaking on the world's coastlines is estimated at 2 to 3 million megawatts. In favorable locations, wave energy density can average 65 MW per mile of coastline. (Ex. 300, pp. 4-70 to 4-74.)

Rather than replacing large scale solar projects such as ISEGS, the above renewable energy technologies are needed to work in consort with it to help California meet its RPS goals and reduce greenhouse gas emissions in its power portfolio.

5. Alternative Methods of Generating or Conserving Electricity

Nonrenewable generation technologies that require use of natural gas, coal, or nuclear energy would not achieve the key project objective for ISEGS: to safely and economically construct and operate a nominal 370 MW, renewable power generating facility in California capable of selling competitively priced renewable

energy consistent with the needs of California utilities. While these generation technologies would not achieve this key objective, we discuss them briefly for comparison purposes. Of the nonrenewable generation alternatives (natural gas, coal, and nuclear), only the natural gas-fired power plants would be viable alternatives within California.

Natural Gas Generation. Natural gas power generation accounts for approximately 22 percent of all the energy used in the United States and 40 percent of the power generated in California. Natural gas power plants typically consist of combustion turbine generators, heat recovery steam generators, a steam turbine generator, wet or dry cooling towers, and associated support equipment. An interconnection with a natural gas pipeline, a water supply, and electric transmission are also required.

A gas-fired power plant generating 370 MW would generally require less than 40 acres of land.

Natural gas power plants may result in numerous environmental impacts such as the following.

- Overall air quality impacts would increase because natural gas-fired power plants contribute to local violations of PM10 and ozone ambient air quality standards, and operational emissions could result in toxic air contaminants that could adversely affect sensitive receptors. Net increases in greenhouse gas emissions due to natural gas-firing in the conventional power plants would also be significant.

- Environmental justice may be a concern. Gas-fired power plants tend to be located in developed urban areas that are zoned for heavy industry. In some instances, low-income and minority populations are also located in such areas.

- Several hazardous materials, including regulated substances (aqueous ammonia, hydrogen, and sulfuric acid), would be transported to and stored at a natural gas power plant during operations.

- Cultural resource impacts can be significant depending on the power plant's location, however, because natural gas power plants require significantly fewer acres per MW of power generated, impacts to cultural resources would be expected to be fewer than with solar facilities.

- Power plant siting may result in the withdrawal of agriculture lands. However, because natural gas power plants require significantly fewer acres per

megawatt of power generated, impacts to agriculture would be expected to be less than with solar facilities should they be sited on agriculture lands.

- Visual impacts may occur with natural gas power plants because they introduce large structures with industrial character. The most prominent structures are frequently the cooling towers, which may reach 100 feet tall, and the power plant stacks, which may reach over 100 feet tall. Visible plumes from the cooling tower would also potentially occur.

Although natural gas generation is clearly a viable technology, it is not a renewable technology, so it would not attain the objective of generating renewable power meeting California's renewable energy needs. The air quality impacts of gas-fired plants include greenhouse gases and are one major reason that California's Renewable Portfolio Standard was developed. (Ex. 300, pp. 4-75 to 4-76.)

Coal Generation. Coal-fired electric generating plants are the cornerstone of America's central power system. Although coal generation is a viable technology, it is not a renewable technology, so it would not attain the objective of generating renewable power meeting California's renewable energy needs. Existing technology for coal-fired plants results in high greenhouse gas emissions. (Ex. 300, pp. 4-76 to 4-77.)

Nuclear Energy. Due to environmental and safety concerns, California law currently prohibits the construction of any new nuclear power plants in California until the Energy Commission finds that the federal government has approved and there exists a demonstrated technology for the permanent disposal of spent fuel from these facilities (CEC 2006). As the permitting of new nuclear facilities in California is currently illegal, this technology is not a feasible alternative. (Ex. 300, p. 4-77.)

Conservation and Demand-Side Management. Conservation and demand-side management consists of a variety of approaches to reduction of electricity use, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution. Energy efficiency helped flatten the state's per capita electricity use and saved consumers more than $56 billion between 1978 and 2005. However, with population growth, increasing demand for energy, and the need to reduce greenhouse gases, there is a greater need for energy efficiency.

Conservation and demand-side management is important for California's energy future and cost effective energy efficiency is considered as the resource of first choice for meeting California's energy needs. However, with population growth and increasing demand for energy, conservation and demand-management alone is not sufficient to address all of California's energy needs. Additionally, it will not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements. (Ex. 300, pp. 4-77 to 4-78.)

6. No Project Alternative

CEQA requires an evaluation of the "No Project" alternative "… to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." [14 Cal. Code Regs., § 15126.6(e)(1).] The "No Project" analysis assumes that baseline environmental conditions would not change because the project would not be constructed, and that the events or actions reasonably expected to occur in the foreseeable future would occur if the project were not approved.

If the "no project" alternative were selected, the construction and operational impacts of the ISEGS project would not occur. There would be no grading of the site, no loss or disturbance of approximately 3,600 acres of desert habitat, and no installation of extensive power generation and transmission equipment. The "no project" alternative would also eliminate contributions to cumulative impacts in the Ivanpah Valley and in the Mojave Desert as a whole.

In the absence of the ISEGS project, however, other power plants, both renewable and nonrenewable, would have to be constructed to serve the demand for electricity. If the "no project" alternative were chosen, other solar renewable power plants may be built, and the impacts to the environment would likely be similar to those of the proposed project because solar renewable technologies require large amounts of land and similar slope and solarity requirements as the proposed ISEGS project. The "no project" alternative may also lead to development of other non-solar renewable technologies to help achieve the California Renewable Portfolio Standard.

Additionally, if the "no project" alternative were chosen, it is likely that additional gas-fired power plants would be built or that existing gas-fired plants could operate longer. If the project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide. PG&E would not receive the 300-MW contribution to its renewable state-mandated energy

portfolio and SCE would not receive the 100 MW renewable energy contribution. (Ex. 300, pp. 4-7 to 4-8.)

FINDINGS OF FACT

Based upon the evidence, we find and conclude as follows:

1. The record contains an acceptable analysis of a reasonable range of site location and generation alternatives to the project as proposed.
2. The No Project alternative is the environmentally superior alternative. It fails, however, to achieve the project objectives.
3. None of the site location or other alternatives to the project offer a superior alternative in terms of feasibly meeting project objectives and reducing its significant environmental impacts.

CONCLUSION OF LAW

1. The record contains a sufficient analysis of Alternatives and complies with the requirements of the California Environmental Quality Act, the Warren-Alquist Act, and their respective regulations.

No Conditions of Certification are required for this topic.

III. COMPLIANCE AND CLOSURE

Public Resources Code section 25532 requires the Commission to establish a post-Certification monitoring system. The purpose of this requirement is to assure that certified facilities are constructed and operated in compliance with applicable laws, ordinances, regulations, standards, as well as the specific Conditions of Certification adopted as part of this Decision.

SUMMARY OF THE EVIDENCE

The evidence of record contains a full explanation of the purposes and intent of the Compliance Plan (Plan). The Plan is the administrative mechanism used to ensure that the Ivanpah Solar Energy Generating Station (ISEGS) is constructed and operated according to the Conditions of Certification. It essentially describes the respective duties and expectations of the Project Owner and the Staff Compliance Project Manager (CPM) in implementing the design, construction, and operation criteria set forth in this Decision.

Compliance with the Conditions of Certification contained in this Decision is verified through mechanisms such as periodic reports and site visits. The Plan also contains requirements governing the planned closure, as well as the unexpected temporary and unexpected permanent closure of the Project.

The Compliance Plan will also be integrated with a U.S. Bureau of Land Management (BLM) Compliance Monitoring Plan (hereafter referred to as the Compliance Plan) to assure compliance with the terms and conditions of any approved Right-of-Way (ROW) grant including the approved Plan of Development (POD).

Additionally, the Conditions of Certification referred to herein serve the purpose of both the Energy Commission's Conditions of Certification for purposes of the California Environmental Quality Act (CEQA) and BLM's Mitigation Measures for purposes of the National Environmental Policy Act (NEPA).

The Compliance Plan is composed of two broad elements. The first element establishes the "General Conditions," which:

- set forth the duties and responsibilities of BLM's Authorized Officer, the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state procedures for requesting and approving ROW Grant or POD changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all BLM and Energy Commission approved conditions of certification/mitigation measures; and
- establish requirements for modifications or amendments to facility Closure, Revegetation, and Restoration Plans.

The second general element of the Plan contains the specific "Conditions of Certification." These are found following the summary and discussion of each individual topic area in this Decision. The individual Conditions contain the measures required to mitigate potentially adverse Project impacts associated with construction, operation, and closure to levels of insignificance. Each Condition also includes a verification provision describing the method of assuring that the Condition has been satisfied.

The contents of the Compliance Plan are intended to be implemented in conjunction with any additional requirements contained in the individual Conditions of Certification.

FINDINGS OF FACT

The evidence establishes:

1. Requirements contained in the Compliance Plan and in the specific Conditions of Certification are intended to be implemented in conjunction with one another.

2. We adopt the following Compliance Plan as part of this Decision.

CONCLUSIONS OF LAW

1. The compliance and monitoring provisions incorporated as a part of this Decision satisfy the requirements of Public Resources Code section 25532.

2. The Compliance Plan and the specific Conditions of Certification contained in this Decision assure that the Ivanpah Solar Generating System (ISEGS) project will be designed, constructed, operated, and closed in conformity with applicable law.

GENERAL CONDITIONS OF CERTIFICATION

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented.

BLM AUTHORIZED OFFICER:

The BLM Authorized Officer for the Project is the BLM Needles Field Manager or his designated Compliance Inspector that is responsible for oversight and inspection of all construction and operational related activities on public land.

PRE-CONSTRUCTION SITE MOBILIZATION

Site mobilization is limited preconstruction activities at the site to allow for the installation of fencing, construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

CONSTRUCTION

On-site work to install permanent equipment or structures for any facility.

Ground Disturbance

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site beyond site mobilization needs, and for access roads and linear facilities.

Grading, Boring, and Trenching

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and removal of soil.

Notwithstanding the definitions of ground disturbance, grading, boring and trenching above, construction does **not** include the following:

1. the installation of environmental monitoring equipment;

2. a soil or geological investigation;

3. a topographical survey;

4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and

5. any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, "commercial operation" begins after the completion of start-up and commissioning, when each of the power plants has reached reliable steady-state production of electricity at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

BLM'S AUTHORIZED OFFICER AND COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

BLM's Authorized Officer and the Compliance Project Manager (CPM) shall oversee the compliance monitoring and is responsible for:

1. Ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of BLM's ROW Grant and the Energy Commission Decision

2. Resolving complaints

3. Processing post-certification changes to the conditions of certification, project description (petition to amend), and ownership or operational control (petition for change of ownership) (See instructions for filing petitions)

4. Documenting and tracking compliance filings

5. Ensuring that compliance files are maintained and accessible

BLM's Authorized Officer is the contact person for BLM and will consult with appropriate responsible agencies, Energy Commission, and Energy Commission staff when handling disputes, complaints, and amendments. The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies, BLM, Energy Commission, and Energy Commission staff when handling disputes, complaints, and amendments.

All project compliance submittals are submitted to BLM's Authorized Officer and the CPM for processing. Where a submittal required by a Condition of Certification requires BLM's Authorized Officer and/or CPM approval, the approval will involve all appropriate BLM personnel, Energy Commission staff and management. All submittals must include searchable electronic versions (pdf or word files).

CHIEF BUILDING OFFICIAL RESPONSIBILITIES

The Chief Building Official (CBO) shall serve as BLM's and the Energy Commission's delegate to assure the project is designed and constructed in

accordance with BLM's Right-of-Way Grant, the Energy Commission's Decision including Conditions of Certification, California Building Standards Code, local building codes and applicable laws, ordinances, regulations and standards to ensure health and safety. The CBO is typically made-up of a team of specialists covering civil, structural, mechanical and electrical disciplines whose duties include the following:

1. Performing design review and plan checks of all drawings, specifications and procedures;

2. Conducting construction inspection;

3. Functioning as BLM's and the Energy Commission's delegate including reporting noncompliance issues or violations to the BLM Authorized Officer for action and taking any action allowed under the California Code of Regulations, including issuing a Stop Work Order, to ensure compliance;

4. Exercising access as needed to all project owner construction records, construction and inspection procedures, test equipment and test results; and

5. Providing weekly reports on the status of construction to BLM's Authorized Officer and the CPM.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

BLM's Authorized Officer and the CPM shall schedule pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings is to assemble technical staff from BLM, the Energy Commission, the project owner and construction contractor to review the status of all pre-construction or pre-operation requirements, contained in BLM's and the Energy Commission's conditions of certification. This is to confirm that all applicable conditions of certification have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that BLM and Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

BLM AND ENERGY COMMISSION RECORD

BLM and the Energy Commission shall maintain the following documents and information as a public record, in either the Energy Commission's Compliance file or Dockets file, for the life of the project (or other period as required):

- All documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- All monthly and annual compliance reports filed by the project owner;

- All complaints of noncompliance filed with BLM and the Energy Commission; and
- All petitions/requests for project or condition of certification changes and the resulting BLM, Energy Commission staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that the compliance conditions of certification and all other conditions of certification that appear in BLM's ROW Grant and the Energy Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or the compliance conditions may result in reopening of the case and revocation of the Energy Commission certification; an administrative fine; or other action as appropriate. A summary of the Compliance Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section.

The BLM ROW grant holder will comply with the terms, conditions, and special stipulations of the ROW grant. Failure to comply with applicable laws or regulations or any of the terms and conditions of a BLM ROW grant may result in the suspension or termination of the ROW grant (43 CFR 2807.17). Prior to suspending or terminating a ROW grant, BLM will provide written notice to the holder stating it intends to suspend or terminate and will provide reasonable opportunity to correct any noncompliance.

COMPLIANCE MITIGATION MEASURES/CONDITIONS OF CERTIFICATION

Unrestricted Access (COMPLIANCE-1)

BLM's Authorized Officer, responsible BLM staff, the CPM, responsible Energy Commission staff, and delegated agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on-site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although BLM's Authorized Officer and the CPM will normally schedule site visits on dates and times agreeable to the project owner, BLM's Authorized Officer and the CPM reserve the right to make unannounced visits at any time.

Compliance Record (COMPLIANCE-2)

The project owner shall maintain project files on-site or at an alternative site approved by BLM's Authorized Officer and the CPM for the life of the project, unless a lesser period of time is specified by the Conditions of Certification. The files shall contain copies of all "as-built" drawings, documents submitted as verification for Conditions, and other project-related documents. As-built drawings of all facilities including linear facilities shall be provided to the BLM

Authorized Officer for inclusion in the BLM administrative record within 90-days of completion of that portion of the facility or project.

BLM and Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files maintained pursuant to this Condition.

Compliance Verification Submittals (COMPLIANCE-3)

Each Condition of Certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted Conditions. The verification procedures, unlike the Conditions, may be modified as necessary by BLM's Authorized Officer and the CPM.

Verification of compliance with the Conditions of Certification can be accomplished by the following:

1. Monthly and/or annual compliance reports, timely filed by the project owner or authorized agent, reporting on work done and providing pertinent documentation, as required by the specific conditions of certification;

2. Appropriate letters from delegate agencies verifying compliance;

3. BLM and Energy Commission staff audits of project records; and/or

4. BLM and Energy Commission staff inspections of work, or other evidence that the requirements are satisfied.

Verification lead times associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. The cover letter subject line shall identify the project by AFC number, the appropriate Condition(s) of Certification by Condition number(s), and a brief description of the subject of the submittal. The project owner shall also identify those submittals not required by a Condition of Certification with a statement such as: "This submittal is for information only and is not required by a specific Condition of Certification." When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal and BLM/CEC submittal number.

The project owner is responsible for the delivery and content of all verification submittals to the BLM's Authorized Officer and CPM, whether such Condition was satisfied by work performed by the project owner or an agent of the project owner.

All hardcopy submittals shall be addressed to each of the following:

BLM's Authorized Officer
(CACA-48668, 49502, 49503, and 49504)
U.S. Bureau of Land Management
1303 South Highway 95
Needles, CA 92363

Compliance Project Manager
(07-AFC-5C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

Those submittals shall be accompanied by a searchable electronic copy, on a CD or by e-mail, as agreed upon by BLM's Authorized Officer and the CPM.

If the project owner desires BLM and/or Energy Commission staff action by a specific date, that request shall be made in the submittal cover letter and shall include a detailed explanation of the effects on the project if that date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those Conditions that must be fulfilled before the start of construction shall be submitted by the project owner to BLM's Authorized Officer and the CPM. This matrix will be included with the project owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be submitted in the same format as the compliance matrix described below. In order to begin any on-site mobilization or surface disturbing activities on public land, the BLM Authorized Officer must approve a written Notice to Proceed (NTP). NTPs will be phased as appropriate to facilitate timely implementation of construction.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and BLM's Authorized Officer and the CPM have issued a letter and BLM has issued a NTP to the project owner authorizing construction. Various lead times for submittal of compliance verification documents to BLM's Authorized Officer and the CPM for conditions of certification are established to allow sufficient BLM and Energy Commission staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner anticipates commencing project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. Compliance submittals should be completed in advance where the necessary lead time for a required compliance event extends beyond the date anticipated for start of construction. The project owner must understand that the submittal of compliance documents prior to

project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change, based upon BLM's ROW Grant and the Energy Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist BLM's Authorized Officer and the CPM in tracking activities and monitoring compliance with the terms and conditions of BLM's ROW Grant and the Energy Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to BLM's Authorized Officer and the CPM in the monthly or annual compliance reports.

Compliance Matrix (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to BLM's Authorized Officer and the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide BLM's Authorized Officer and the CPM with the current status of all Conditions of Certification in a spreadsheet format. The compliance matrix must identify:

1. the technical area;

2. the condition number;

3. a brief description of the verification action or submittal required by the Condition;

4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);

5. the expected or actual submittal date;

6. the date a submittal or action was approved by the Chief Building Official (CBO), BLM's Authorized Officer, CPM, or delegate agency, if applicable; and

7. the compliance status of each condition, e.g., "not started," "in progress" or "completed" (include the date).

8. if the Condition was amended, the date of the amendment.

Satisfied Conditions shall be placed at the end of the matrix.

Monthly Compliance Report (COMPLIANCE-6)

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by BLM's Authorized Officer and the CPM. The first Monthly Compliance Report shall include the AFC number and an initial list of dates for each of the events identified on the **Key Events List** found at the end of this section.

During pre-construction and construction of each power plant, the project owner or authorized agent shall submit an original and an electronic searchable version of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. A summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. Documents required by specific Conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, as well as the conditions they satisfy and submitted as attachments to the Monthly Compliance Report;

3. An initial, and thereafter updated, compliance matrix showing the status of all Conditions of Certification (fully satisfied Conditions do not need to be included in the matrix after they have been reported as completed);

4. A list of Conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the Condition;

5. A list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;

6. A cumulative listing of any approved changes to Conditions of Certification;

7. A listing of any filings submitted to, or permits issued by, other governmental agencies during the month;

8. A projection of project compliance activities scheduled during the next two months. The project owner shall notify BLM's Authorized Officer and the CPM as soon as any changes are made to the project construction schedule that would affect compliance with Conditions of Certification;

9. A listing of the month's additions to the on-site compliance file; and

10. A listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved actions, and the status of any unresolved actions.

All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by BLM's Authorized Officer and the CPM.

Annual Compliance Report (COMPLIANCE-7)

After construction of each power plant is complete or when a power plant goes into commercial operation, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to BLM's Authorized Officer and the CPM each year at a date agreed to by BLM's Authorized Officer and the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by BLM's Authorized Officer and the CPM. Each Annual Compliance Report shall include the AFC number, identify the reporting period and shall contain the following:

1. An updated compliance matrix showing the status of all Conditions of Certification (fully satisfied Conditions do not need to be included in the matrix after they have been reported as completed);

2. A summary of the current project operating status and an explanation of any significant changes to facility operations during the year;

3. Documents required by specific Conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, with the condition it satisfies, and submitted as attachments to the Annual Compliance Report;

4. A cumulative listing of all post-certification changes by the Energy Commission or changes to the BLM ROW grant or approved POD by BLM , or cleared by BLM's Authorized Officer and the CPM;

5. An explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;

6. A listing of filings submitted to, or permits issued by, other governmental agencies during the year;

7. A projection of project compliance activities scheduled during the next year;

8. A listing of the year's additions to the on-site compliance file;

9. An evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see Compliance Conditions for Facility Closure addressed later in this section]; and

10. A listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

Confidential Information (COMPLIANCE-8)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq. Any information the ROW holder deems confidential shall be submitted to the BLM Authorized Officer with a written request for said confidentiality along with a justification for the request. All confidential submissions to BLM should be clearly stamped "proprietary information" by the holder when submitted.

Annual Energy Facility Compliance Fee (COMPLIANCE-9)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay the Energy Commission an annual compliance fee, which is adjusted annually. The amount of the fee for FY2009-2010 was $19,823. The initial payment is due on the date the Energy Commission adopts the Final Decision. You will be notified of the amount due. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

Reporting of Complaints, Notices, and Citations (COMPLIANCE-10)

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to BLM's Authorized Officer and the CPM who will post it on the Energy Commission's web page at: **http://www.energy.ca.gov/sitingcases/power_plants_contacts.html**

Any changes to the telephone number shall be submitted immediately to BLM's Authorized Officer and the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to BLM's Authorized Officer and the CPM of all complaint forms, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** Conditions of Certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to implement the Closure, Revegetation and Restoration Plan to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure. Closure would be conducted in accordance with Condition of Certification **BIO-14** that requires the project owner to develop and implement a Closure, Revegetation and Rehabilitation Plan.

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure and unplanned permanent closure**.**

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency. Short-term is defined as cessation of construction activities or operations of a power plant for a period less than 6 months long. Cessation of construction of operations for a period longer than 6 months in considered a permanent closure.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where the project owner fails to implement the contingency plan, and the project is essentially abandoned.

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a revision or update to the approved Closure, Revegetation and Rehabilitation Plan to BLM and the Energy Commission for review and approval at least 12 months (or other period of time agreed to by BLM's Authorized Officer and the CPM) prior to commencement of closure activities. The project owner shall file 50 copies and 50 CDs with the Energy Commission and 10 copies and 10 CDs with BLM (or other number of copies agreed upon by BLM's Authorized Officer and the CPM) of a proposed facility closure plan/Closure, Revegetation and Rehabilitation Plan.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related materials that must be removed from the site;

2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;

3. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable Conditions of Certification; and.

4. Address any changes to the site revegetation, rehabilitation, monitoring and long-term maintenance specified in the existing plan that are needed for site revegetation and rehabilitation to be successful.

Prior to submittal of an amended or revised Closure, Revegetation and Restoration Plan, a meeting shall be held between the project owner, BLM's Authorized Officer and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility Closure, Revegetation and Restoration plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, BLM's Authorized Officer the CPM shall hold one or more workshops and/or BLM and the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities until BLM and the Energy Commission approves the facility Closure, Revegetation and Restoration plan.

Unplanned Temporary Closure/On-Site Contingency Plan (COMPLIANCE-12)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an On-Site Contingency Plan in place. The On-Site Contingency Plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an On-Site Contingency Plan for BLM's Authorized Officer and CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by BLM's Authorized Officer and the CPM) after approval of any NTP or letter granting approval to commence construction for each phase of construction. A copy of the approved plan must be in place during commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with BLM's Authorized Officer and the CPM, will update the On-Site Contingency Plan as necessary. BLM's Authorized Officer and the CPM may require revisions to the On-Site Contingency Plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the On-Site Contingency Plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by BLM's Authorized Officer and the CPM.

The On-Site Contingency Plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by BLM's Authorized Officer and the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the On-Site Contingency Plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify BLM's Authorized Officer and the CPM, as well as other responsible agencies, by

telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the On-Site Contingency Plan. The project owner shall keep BLM's Authorized Officer and the CPM informed of the circumstances and expected duration of the closure.

If BLM's Authorized Officer and the CPM determine that an unplanned temporary closure is likely to be permanent, or for a duration of more than 6 months, a Closure Plan consistent with the requirements for a planned closure shall be developed and submitted to BLM's Authorized Officer and the CPM within 90 days of BLM's Authorized Officer and the CPM's determination (or other period of time agreed to by BLM's Authorized Officer and the CPM).

Unplanned Permanent Closure/On-Site Contingency Plan (COMPLIANCE-13)

The On-Site Contingency Plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the On-Site Contingency Plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify BLM's Authorized Officer and the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the On-Site Contingency Plan. The project owner shall keep BLM's Authorized Officer and the CPM informed of the status of all closure activities.

To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an On-Site Contingency Plan no less than 60 days after a NTP is issued for each phase of development.

Post Certification Changes to BLM's ROW Grant and/or the Energy Commission Decision: Amendments, Ownership Changes, Insignificant Project Changes and Verification Changes (COMPLIANCE-14)

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. The BLM ROW holder must file a written requests in the form an an application to the BLM Authorized Officer in order to change the terms and Conditions of their ROW grant or POD. Written requests will be in a manner prescribed by the BLM Authorized Officer.

It is the responsibility of the project owner to contact BLM's Authorized Officer and the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769. Implementation of a project modification without first securing BLM and either Energy Commission or Energy Commission staff approval, may result in enforcement action in accordance with section 25534 of the Public Resources Code.

A Petition to Amend is required for changes to the project as specified below. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to BLM's Authorized Officer and the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of Section 1769 at the time this Condition was drafted. If the Commission's rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

Amendment

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769(a), when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in deletion or change of a Condition of Certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations or standards, the petition will be processed as a formal amendment to the Energy Commission's Final Decision, which requires public notice and review of the BLM-Energy Commission staff analysis, and approval by the full Energy Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(a). Upon request, the CPM will provide you with a sample petition to use as a template.

The ROW holder shall file an application to amend the BLM ROW grant for any substantial deviation or change in use. The requirements to amend a ROW grant are the same as when filing a new application including paying processing and monitoring fees and rent.

Change of Ownership

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769(b). This process requires public notice and approval by the full Commission and BLM. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(b). Upon request, the CPM will provide you with a sample petition to use as a template. The transfer of ownership of a BLM ROW grant must be through the filing of an application for assignment of the grant.

Insignificant Project Change

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations and standards may be authorized by BLM's Authorized Officer and the CPM as an insignificant project change pursuant to section 1769(a) (2). This process usually requires minimal time to complete, and it requires an Energy Commission 14-day public review of the Notice of Insignificant Project Change that includes the BLM and Energy Commission staff's intention to approve the modification unless substantive objections are filed. These requests must also be submitted in the form of a "Petition to Amend" as described above. BLM and the Energy Commission intend to integrate a process to jointly approve insignificant project changes to avoid duplication of approval processes and ensure appropriate documentation for the public record.

Verification Change

A verification may be modified by BLM's Authorized Officer and the CPM without requesting an amendment to the ROW Grant or Energy Commission Decision if the change does not conflict with the Conditions of Certification and provides an effective alternate means of verification.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, BLM and Energy Commission staff act as, and have the authority of, the Chief Building Official (CBO). BLM and Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. BLM and the Energy Commission intend to avoid duplication by integrating the responsibilities of the CBO with those of a BLM compliance inspector and will work jointly in the selection of a CBO. BLM and Energy Commission staff retain CBO authority when selecting a delegate CBO, including enforcing and interpreting federal, state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

BLM and Energy Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental protection when conducting project monitoring.

ENFORCEMENT

BLM's legal authority to enforce the terms and conditions of its ROW Grant is specified in 43 CFR 2807.16 to 2807.19. BLM may issue an immediate temporary suspension of activities it they determine a holder has violated one or more of the terms, conditions, or stipulation of the grant. BLM may also suspend or terminate a ROW grant if a holder does not comply with applicable laws and regulation or any terms, conditions, or special stipulations contained in the grant.

Prior to suspending or terminating a ROW grant, BLM will provide written notice to the holder stating it intends to suspend or terminate and will provide reasonable opportunity to correct any noncompliance.

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

ENERGY COMMISSION NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

Informal Dispute Resolution Process

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate an informal dispute resolution process. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This process may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The process encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation procedure.

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner, BLM and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM find that further investigation is necessary, the project owner will be asked to promptly investigate the matter. Within seven working days of the CPM's request, provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to also provide an initial verbal report, within 48 hours.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;

3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner;

4. After the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and accurately identifies the positions of all parties and any understandings reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with a Commission decision adopted pursuant to Public Resources Code section 25500. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1237.

KEY EVENTS LIST

PROJECT/POWER PLANT: DOCKET #:

BLM'S AUTHORIZED OFFICER: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	**DATE**
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Roll of Steam Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
GENERATION TIE LINE ACTIVITIES	
Start Generation Tie Line Construction	
Synchronization with Grid and Interconnection	
Complete Generation Tie Line Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner shall grant BLM and Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner shall maintain project files on-site. BLM and Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to BLM's Authorized Officer and the CPM, whether such condition was satisfied by work performed or the project owner or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until the all of the following activities/submittals have been completed: • property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, • a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, • all pre-construction conditions have been complied with, • BLM's Authorized Officer and the CPM have issued a letter to the project owner authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-6	Monthly Compliance Report including a Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to BLM and the Energy Commission's Dockets Unit with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee to the Energy Commission;
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to BLM's Authorized Officer and the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit any revisions or changes to the Closure, Revegetation and Restoration Plan to BLM's Authorized Officer and the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an On-Site Contingency Plan no less than 60 days after a NTP is issued for each power plant.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an On-Site Contingency Plan no less than 60 days after a NTP is issued for each power plant.
COMPLIANCE-14	Post-certification changes to the ROW Grant and/or Decision	The project owner must petition the Energy Commission and file an application to amend the ROW grant to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

ATTACHMENT A

COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME: AFC Number:
COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number:
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence:
Description of complaint (including dates, frequency, and duration):
Findings of investigation by plant personnel: Indicate if complaint relates to violation of the ROW Grant: Indicate if complaint relates to violation of a CEC requirement: Date complainant contacted to discuss findings:
Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution: If not, explain: Other relevant information:
If corrective action necessary, date completed: Date first letter sent to complainant: ___(copy attached) Date final letter sent to complainant: ___(copy attached)
This information is certified to be correct. Plant Manager's Signature: _____ Date:

(Attach additional pages and supporting documentation, as required.)

IV. ENGINEERING ASSESSMENT

The broad engineering assessment of the ISEGS consists of separate analyses that examine its facility design, engineering, efficiency, and reliability aspects. These analyses include the on-site power generating equipment and the project-related linear facilities.

A. FACILITY DESIGN

This review covers several technical disciplines including the civil, electrical, mechanical, and structural engineering elements related to project design and construction. The evidentiary presentations were uncontested. (12/14/2009 RT 54-62, 305 - 307; Exs. 1; 4; 5; 7; 20; 21; 28; 29; 30; 31; 300, § 7.1.) The "Mitigated Ivanpah 3" submission does not affect project impacts or mitigation for this topic area. (Exs. 88; 315.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

The Application for Certification (AFC) describes the preliminary facility design. In considering the adequacy of the plans, the Commission reviews whether the power plant and linear facilities are described with sufficient detail to assure the project can be designed and constructed in accordance with applicable engineering laws, ordinances, regulations, and standards (LORS). The review also includes, as appropriate, the identification of special design features that are necessary to deal with unique site conditions which could impact public health and safety, the environment, or the operational reliability of the project. (Ex. 300, pp. 7.1-1 to 7.1-2.)

Staff considered potential geological hazards and reviewed the preliminary project design with respect to grading, flood protection, erosion control, site drainage, and site access in addition to the criteria for designing and constructing related linear facilities such as the natural gas and transmission interconnection facilities. (Ex. 300, p. 7.1-3; see also, the **Geology and Paleontology** section of this Decision.) The evidence establishes that the project will incorporate accepted industry standards. This includes design practices and construction methods for preparing and developing the site. (*Id.*) Conditions **CIVIL-1** through **CIVIL-4** ensure that these activities will be conducted in compliance with applicable LORS.

Major structures, systems, and equipment include structures and associated components necessary for power production and facilities used for storage of hazardous or toxic materials, as well as those capable of becoming potential health and safety hazards if not constructed properly. (Ex. 300, p. 7.1-3.) **Table 1**, contained in Condition **GEN-2,** lists the major structures and equipment included in the initial engineering design for the project.[1] Conditions **GEN-3** through **GEN-8** require that qualified individuals oversee and inspect construction of the facility. Similarly, Conditions **MECH-1** through **MECH-3** address compliance of the project's mechanical systems with appropriate standards, and a quality assurance/quality control program assures that the project will be designed, procured, fabricated, and installed as described. Condition **ELEC-1** provides assurance that design and construction of major electrical features will comply with applicable LORS. Compliance with design requirements will be verified through specific inspections and audits. (Ex. 300, p. 7.1-4.)

The power plant site is located in Seismic Risk Zone 3. (Ex. 300, p. 7.1-2.) The 2007 CBC requires specific "dynamic" lateral force procedures for certain structures to determine their seismic design criteria; others may be designed using a "static" analysis procedure. To ensure that project structures are analyzed appropriately, Condition **STRUC-1** requires the project owner to submit its proposed lateral force procedures to the Chief Building Official[2] (CBO) for review and approval prior to the start of construction. (Ex. 300, p. 7.1-3.)

The Conditions of Certification establish a design review and construction inspection process to verify compliance with applicable standards and special requirements. (Ex. 300, p. 7.1-4.) The project will be designed and constructed in conformance with the latest edition of the California Building Standards Code (currently the 2007 CBSC) and other applicable codes and standards in effect at the time design approval and construction actually begin. (Ex. 300, p. 7.1-3.) Condition of Certification **GEN-1** incorporates this requirement.

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[1] The master drawing and master specifications lists described in Condition **GEN-2** include documents based on the project's *detailed* design and may include additional documents for structures and equipment not currently identified in Table 1. (Ex. 300, p. 7.1-3.)

[2] The Energy Commission is the CBO for facilities we certify. We may delegate CBO authority to local building officials and/or independent consultants to carry out design review and construction inspections. When CBO duties are delegated, we require a Memorandum of Understanding with the delegate entity to outline respective roles, responsibilities, and qualifications of involved individuals such as those described in Conditions of Certification **GEN-1** through **GEN-8**. (Ex. 300, p. 7.1-4.) The Conditions further require that every appropriate element of project construction be first approved by the CBO and that qualified personnel perform or oversee inspections.

The evidentiary record also addresses project closure, which may range from "mothballing" the facility to removing all equipment and restoring the site. (Ex. 300, p. 7.1-5.) To ensure that decommissioning of the facility will conform to applicable LORS and be completed in a manner that protects the environment and public health and safety, the project owner is required to submit a decommissioning plan which will identify: decommissioning activities; applicable LORS in effect when decommissioning occurs; activities necessary to restore the site, if appropriate; and decommissioning alternatives. (*Id.*) The general closure provisions of the Compliance Monitoring and Closure Plan describe related requirements. *See* the **Compliance and Closure** section in this Decision.

Overall, the evidentiary record conclusively establishes that the project will be designed and constructed in compliance with all applicable LORS, and that these activities will not negatively impact public health and safety.

FINDINGS OF FACT

Based on the uncontroverted evidence, the Commission makes the following findings:

1. The ISEGS Project is currently in the preliminary design stage.
2. The facility can be designed and constructed in conformity with the applicable laws, ordinances, regulations, and standards (LORS) set forth in the appropriate portion of **Appendix A** of this Decision.
3. The Conditions of Certification set forth below provide, in part, that qualified personnel will perform design review, plan checking, and field inspections of the project.
4. The Conditions of Certification set forth below are necessary to ensure that the project is designed and constructed both in accordance with applicable law and in a manner that protects environmental quality as well as public health and safety.
5. The **General Conditions,** included in the **Compliance and Closure** section of this Decision, establish requirements to be followed in the event of facility closure.

CONCLUSION OF LAW

1. We therefore conclude that implementation of the Conditions of Certification listed below ensure that the ISEGS Project will be designed and constructed in conformance with the applicable LORS pertinent to the engineering aspects summarized in this section of the Decision.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the chief building official (CBO) for review and approval. The CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously. The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility (2007 CBC, Appendix Chapter 1, section 101.2, Scope). All transmission facilities (lines, switchyards, switching stations, and substations) are covered in the Conditions of Certification in the **Transmission System Engineering** section of this Decision.

In the event that the initial engineering designs are submitted to the CBO when the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction, or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

Verification: Within 30 days following receipt of the certificate of occupancy, the project owner shall submit to BLM's Authorized Officer and to the Compliance Project Manager (CPM) a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's Decision have been met in the area of facility design. The project owner shall provide BLM's Authorized Officer and the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO (2007 CBC, Appendix Chapter 1, section 110, Certificate of Occupancy).

Once the certificate of occupancy has been issued, the project owner shall inform BLM's Authorized Officer and the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance being performed

on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. BLM's Authorized Officer and the CPM shall then determine if the CBO needs to approve the work.

GEN-2 Before submitting the initial engineering designs for CBO review, the project owner shall furnish BLM's Authorized Officer, the CPM, and the CBO with a schedule of facility design submittals, and master drawing and master specifications lists. The schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by BLM's Authorized Officer and/or Energy Commission staff, the project owner shall provide specific packages to BLM's Authorized Officer and/or the CPM upon request.

Verification: At least 60 days (or within a project owner and CBO approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO, BLM's Authorized Officer, and to the CPM the schedule, the master drawing, and master specifications lists of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 1,** below. Major structures and equipment may be added to or deleted from the table only with BLM's Authorized Officer and CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

Facility Design Table 1
Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Turbine Generator Foundation and Connections	3
Boiler Structure, Foundation and Connections	10
Air Cooled Condenser Structure, Foundation and Connections	3
Feed Water Preheater Structure, Foundation and Connections	3
Deaerator Structure, Foundation and Connections	3
Steam Distributor Structure, Foundation and Connections	3
Water Treatment Plant, Administration and Electrical Building Structure, Foundation and Connections	4
Water Storage Tanks Structure, Foundation and Connections	3
Maintenance Wing Structure, Foundation and Connections	3
Turbine Lubrication System Foundation and Connections	3
Emergency Generator Foundation and Connections	3
Diesel Fire Pump Foundation and Connections	3
Reheat Tower Structure, Foundation and Connections	3
Emergency Generator Exhaust Structure, Foundation and Connections	3
Pipe Bridge Structure, Foundation and Connections	3
Solar Fields and Towers Structures, Foundations and Connections	3 Lots
Evaporation Pits	3 Lots
Drainage Systems (including sanitary drain and waste)	3 Lots
High Pressure and Large Diameter Piping and Pipe Racks	3 Lots
HVAC and Refrigeration Systems	3 Lots
Temperature Control and Ventilation Systems (including water and sewer connections)	3 Lots
Building Energy Conservation Systems	3 Lots
Switchyard, Buses, and Towers	3 Lots
Substation	1 Lot
Electrical Duct Banks	3 Lots

GEN-3 The project owner shall make payments to the CBO for design review, plan checks, and construction inspections based upon a reasonable fee schedule negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 2007 CBC (2007 CBC, Appendix Chapter 1, section 108, Fees; Chapter 1, section 108.4, Permits, Fees, Applications and Inspections), adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be otherwise agreed upon by the project owner and the CBO.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to BLM's Authorized Officer and the CPM in the next monthly compliance report indicating that applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California- registered architect, structural engineer, or civil engineer as the resident engineer (RE) in charge of the project (2007 California Administrative Code, section 4-209, Designation of Responsibilities). All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the Conditions of Certification in the **Transmission System Engineering** section of this Decision.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The RE shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these Conditions of Certification, approved plans, and specifications;
3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;
4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and

other engineers who have been delegated responsibility for portions of the project; and

6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests when they do not conform to approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify BLM's Authorized Officer and the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or within a project owner and CBO approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify BLM's Authorized Officer and the CPM of the CBO's approvals of the RE and other delegated engineer(s) within 5 days of the approval.

If the RE or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has 5 days to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify BLM's Authorized Officer and the CPM of the CBO's approval of the new engineer within 5 days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California-registered engineers to the project: a civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California-registered engineers to the project: a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731, and 6736 require state registration to practice as a civil engineer or structural engineer in California.) All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in "Conditions of Certification" in the **Transmission System Engineering** section of this Decision.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures,

equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California-registered electrical engineer.

The project owner shall submit to the CBO, for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project (2007 CBC, Appendix Chapter 1, section 104, Duties and Powers of Building Official).

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify BLM's Authorized Officer and the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

   1. Review the foundation investigations, geotechnical, or soils reports prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;

   2. Design (or be responsible for the design of), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads, and sanitary sewer systems; and

   3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

   1. Review all the engineering geology reports;

   2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement, or collapse when saturated under load (2007 CBC, Appendix J, section J104.3, Soils Report; Chapter 18, section 1802.2, Foundation and Soils Investigations);

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC, Appendix J, section J105, Inspections, and the 2007 California Administrative Code, section 4-211, Observation and Inspection of Construction (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and
4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations (2007 CBC, Appendix Chapter 1, section 114, Stop Orders).

C. The engineering geologist shall:
   1. Review all the engineering geology reports and prepare a final soils grading report; and
   2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2007 California Administrative Code, section 4-211, Observation and Inspection of Construction (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:
   1. Be directly responsible for the design of the proposed structures and equipment supports;
   2. Provide consultation to the RE during design and construction of the project;
   3. Monitor construction progress to ensure compliance with engineering LORS;
   4. Evaluate and recommend necessary changes in design; and
   5. Prepare and sign all major building plans, specifications, and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO stating that the proposed final design plans, specifications, and calculations conform to all of the mechanical engineering design requirements set forth in BLM's Right-of-Way Decision and the Energy Commission's Decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or within a project owner and CBO approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer, and engineering geologist assigned to the project.

At least 30 days (or within a project owner and CBO approved alternative time frame) prior to the start of construction, the project owner shall submit to the CBO for review and approval resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify BLM's Authorized Officer and the CPM of the CBO's approvals of the responsible engineers within 5 days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has 5 days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify BLM's Authorized Officer and the CPM of the CBO's approval of the new engineer within 5 days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, the project owner shall assign to the project a qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2007 CBC, Chapter 17, section 1704, Special Inspections; Chapter 17A, section 1704A, Special Inspections; and Appendix Chapter 1, Section 109, Inspections. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in "Conditions of Certification" in the **Transmission System Engineering** section of this Decision.

A certified weld inspector, certified by the American Welding Society (AWS) and/or American Society of Mechanical Engineers (ASME), as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks, and pressure vessels).

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;
2. Observe the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction then, if uncorrected, to the CBO, BLM's Authorized Officer, and the CPM for corrective action (2007 CBC, Chapter 17, section 1704.1.2, Report Requirements); and
4. Submit a final signed report to the RE, CBO, BLM's Authorized Officer, and the CPM stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

Verification: At least 15 days (or within a project owner and CBO approved alternative time frame) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to BLM's Authorized Officer and the CPM, the name(s) and qualifications of the certified weld inspector(s) or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to BLM's Authorized Officer and the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next monthly compliance report.

If the special inspector is subsequently reassigned or replaced, the project owner has 5 days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify BLM's Authorized Officer and the CPM of the CBO's approval of the newly assigned inspector within 5 days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend required corrective actions (2007 CBC, Appendix Chapter 1, section 109.6, Approval Required; Chapter 17, section 1704.1.2, Report Requirements). The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this Condition of Certification and, if appropriate, applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to BLM's Authorized Officer and to the CPM in the next monthly compliance report. If any corrective action is disapproved, the project owner shall advise BLM's Authorized Officer and the CPM, within 5 days, of the reason for disapproval and the revised corrective action necessary to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request that the CBO inspect the completed structure and review the submitted documents. The project owner shall

notify BLM's Authorized Officer and the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at an alternative site approved by BLM's Authorized Officer and the CPM during the operating life of the project (2007 CBC, Appendix Chapter 1, section 106.3.1, Approval of Construction Documents). Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by BLM's Authorized Officer and the CPM.

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to BLM's Authorized Officer and the CPM, in the next monthly compliance report: (a) a written notice that the completed work is ready for final inspection; and (b) a signed statement that the work conforms to the final approved plans. After storing the final approved engineering plans, specifications, and calculations described above, the project owner shall submit to BLM's Authorized Officer and the CPM a letter stating both that the above documents have been stored and the storage location of those documents.

Within 90 days of the completion of construction the project owner, at its own expense, shall provide to the CBO three sets of electronic copies of the above documents. These shall be provided in the form of "read only" (Adobe .pdf 6.0) files, with restricted (password-protected) printing privileges, on archive quality compact discs.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils, geotechnical, or foundation investigations reports required by the 2007 CBC, Appendix J, section J104.3, Soils Report, and Chapter 18, section 1802.2, Foundation and Soils Investigation.

Verification: At least 15 days (or within a project owner and CBO approved alternative time frame) prior to the start of site grading, the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall

submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area (2007 CBC, Appendix Chapter 1, section 114, Stop Work Orders).

Verification: The project owner shall notify BLM's Authorized Officer and the CPM, within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide BLM's Authorized Officer and the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 2007 CBC, Appendix Chapter 1, section 109, Inspections, and Chapter 17, section 1704, Special Inspections. All plant site-grading operations for which a grading permit is required shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, BLM's Authorized Officer, and the CPM (2007 CBC, Chapter 17, section 1704.1.2, Report Requirements). The project owner shall prepare a written report, with copies to the CBO, BLM's Authorized Officer, and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within 5 days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO, BLM's Authorized Officer, and the CPM a non-conformance report (NCR) and the proposed corrective action for review and approval. Within 5 days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO, BLM's Authorized Officer, and the CPM. A list of NCRs for the reporting month shall also be included in the following monthly compliance report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans (2007 CBC, Chapter 17, section 1703.2, Written Approval).

Verification: Within 30 days (or a project owner and CBO approved alternative time frame) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities

and all erosion control measures were completed in accordance with the final approved combined grading plans and that the facilities are adequate for their intended purposes, along with a copy of the transmittal letter to BLM's Authorized Officer and the CPM. The project owner shall submit a copy of the CBO's approval to BLM's Authorized Officer and the CPM in the next monthly compliance report.

STRUC-1 Prior to the start of any increment of construction of any major structure or component listed in **Facility Design Table 1** of Condition of Certification **GEN-2**, above, the project owner shall 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. Proposed lateral force procedures, designs, plans, and drawings shall be those for the following items (from **Table 1**, above):

1. Major project structures;
2. Major foundations, equipment supports, and anchorage; and
3. Large field-fabricated tanks.

Construction of any structure or component shall not begin until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;
2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (for example, highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications (2007 CBC, Appendix Chapter 1, section 109.6, Approval Required);
3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation (2007 California Administrative Code, section 4-210, Plans, Specifications, Computations and Other Data);
4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations,

and specifications shall be signed and stamped by the responsible design engineer (2007 CBC, Appendix Chapter 1, section 106.3.4, Design Professional in Responsible Charge); and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS (2007 CBC, Appendix Chapter 1, section 106.3.4, Design Professional in Responsible Charge).

Verification: At least 60 days (or within a project owner and CBO approved alternative time frame) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 1** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO the above final design plans, specifications, and calculations with a copy of the transmittal letter to BLM's Authorized Officer and the CPM.

The project owner shall submit to BLM's Authorized Officer and the CPM, in the next monthly compliance report, a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and comply with the requirements set forth in applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);
2. Concrete pour sign-off sheets;
3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);
4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing [NDT] procedure and results, welder qualifications, certifications, qualified procedure description or number [ref: AWS}); and
5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2007 CBC, Chapter 17, section 1704, Special Inspections, and Section 1709.1, Structural Observations.

Verification: If a discrepancy is discovered in any of the above data the project owner shall, within 5 days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to BLM's Authorized Officer and the CPM (2007 CBC, Chapter 17, section 1704.1.2, Report Requirements). The NCR shall reference the Condition(s) of Certification and the applicable CBC chapter and

section. Within 5 days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to BLM's Authorized Officer and the CPM within 15 days. If disapproved, the project owner shall advise BLM's Authorized Officer and the CPM, within 5 days, of the reason for disapproval and the revised corrective action necessary to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2007 CBC including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes and shall give the CBO prior notice of the intended filing (2007 CBC, Appendix Chapter 1, section 106.1, Submittal Documents; section 106.4, Amended Construction Documents; 2007 California Administrative Code, section 4-215, Changes in Approved Drawings and Specifications).

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to BLM's Authorized Officer and the CPM. The project owner shall notify BLM's Authorized Officer and the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in the 2007 CBC, Chapter 3, Table 307.1(2) shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or within a project owner and CBO approved alternate time frame) prior to the start of installation of the tanks or vessels containing the above-specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to BLM's Authorized Officer and the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to BLM's Authorized Officer and the CPM in the monthly compliance report following completion of any inspection.

MECH-1 The project owner shall submit for CBO design review and approval the proposed final design, specifications, and calculations for each plant major piping and plumbing system listed in **Facility Design Table 1**, Condition of Certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety

need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of that construction (2007 CBC, Appendix Chapter 1, section 106.1, Submittal Documents; section 109.5, Inspection Requests; section 109.6, Approval Required; 2007 California Plumbing Code, section 301.1.1, Approvals).

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations, and industry standards (2007 CBC, Appendix Chapter 1, section 106.3.4, Design Professional in Responsible Charge) which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- San Bernardino County codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency (2007 CBC, Appendix Chapter 1, section 103.3, Deputies).

Verification: At least 30 days (or within a project owner and CBO approved alternative time frame) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 1**, Condition of Certification **GEN-2,** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with applicable LORS, and shall send BLM's Authorized Officer and the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to BLM's Authorized Officer and the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal/OSHA), prior to operation, the code certification papers and other documents required by applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal/OSHA inspection of that installation (2007 CBC, Appendix Chapter 1, section 109.5, Inspection Requests).

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and
2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or within a project owner and CBO approved alternative time frame) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval the above-listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to BLM's Authorized Officer and the CPM.

The project owner shall transmit to BLM's Authorized Officer and the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal/OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC), or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

Verification: The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of

construction, the project owner shall request the CBO's inspection and approval of that construction. The final plans, specifications, and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings, and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications, and calculations conform with the applicable LORS (2007 CBC, Appendix Chapter 1, section 109.3.7, Energy Efficiency Inspections; section 106.3.4, Design Professionals in Responsible Charge).

At least 30 days (or within a project owner and CBO approved alternative time frame) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to BLM's Authorized Officer and the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 volts or higher (see a representative list, below), with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit for CBO design review and approval the proposed final design, specifications, and calculations (2007 CBC, Appendix Chapter 1, section 106.1, Submittal Documents). Upon approval the above-listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS (2007 CBC, Appendix Chapter 1, section 109.6, Approval Required; section 109.5, Inspection Requests). All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in "Conditions of Certification" in the **Transmission System Engineering** section of this Decision.

A. Final plant design plans shall include:

   1. One-line diagrams for the 13.8-kV, 4.16-kV, and 480-volt systems; and
   2. System grounding drawings.

B. Final plant calculations must establish:

   1. Short-circuit ratings of plant equipment;
   2. Ampacity of feeder cables;
   3. Voltage drop in feeder cables;
   4. System grounding requirements;

5. Coordination study calculations for fuses, circuit breakers, and protective relay settings for the 13.8-kV, 4.16-kV, and 480-volt systems;
6. System grounding requirements; and
7. Lighting energy calculations.

C. The following activities shall be reported to BLM's Authorized Officer and the CPM in the monthly compliance report:

1. Receipt or delay of major electrical equipment;
2. Testing or energization of major electrical equipment; and
3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission Decision.

Verification: At least 30 days (or within a project owner and CBO approved alternative time frame) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above-listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send BLM's Authorized Officer and the CPM a copy of the transmittal letter in the next monthly compliance report.

B. POWER PLANT EFFICIENCY

The Ivanpah Solar Electric Generating System (ISEGS) will use solar energy to generate up to 95 percent of its capacity and natural gas to generate up to five percent of its capacity. Pursuant to the California Environmental Quality Act (CEQA), we must determine whether the consumption of natural gas (a non-renewable form of energy) will result in substantial impacts upon energy resources. (Cal. Code Regs., tit. 14 § 15126.4(a)(1), App. F.)

The evidence examines the efficiency of the project design and examines whether the project will incorporate measures that prevent or reduce wasteful, inefficient, or unnecessary energy consumption. (12/14/09 RT 62 to 63, 305 to 307; Exs. 4; 5; 7; 20; 21; 28; 29; 30; 31; 65, §1c, 300, pp. 7.2-1 to 7.2-15.) However, there are no LORS that establish solar power plant efficiency criteria.

SUMMARY AND DISCUSSION OF THE EVIDENCE

The project objectives include generating 400 megawatts (MW) of electricity, using BrightSource's Distributed Power Tower (DPT) advanced solar power technology. The project is intended to decrease reliance on fossil fuel and increase reliance on renewable energy sources. The solar field and power generation equipment will start each morning after sunrise once solar radiation builds up, and will shut down in the evening when solar radiation drops below the level required for keeping the steam turbines online. The natural gas-fired boilers will be used to bring the system up to operating temperature in the morning and periodically to keep system temperatures up when sunlight is temporarily blocked. (Ex. 300, pp. 7.2-1 to 7.2-3.)

Applicant and Staff evaluated alternative generating technologies. Staff independently concluded that given the project objectives, location, air pollution control requirements, and the commercial availability of various alternative technologies, that the selected solar thermal technology is a feasible selection. (Ex. 300, p. 7.2-5.)

1. Natural Gas Use - Impacts

The project will burn natural gas at a nominal rate of approximately 833 million Btu (British Thermal Units) per hour. This rate is very low compared to a typical natural gas-fired power plant of equal capacity. Further, average daily operation for the natural gas boilers would be limited to one hour.

The evidence also establishes that Kern River Gas Transmission Company (KRGTC) is a reliable source for the natural gas.

Thus, the record shows that the impact of the project's minimal consumption of natural gas on energy supplies and energy efficiency will be less than significant. Moreover, because the KRGTC system is capable of delivering the gas that ISEG's requires and is a reliable source for the ISEGS project, it is unlikely that the project will create a substantial increase in natural gas demand. (Ex. 300, pp. 7.2-4 to 7.2-5.)

2. Solar Land Use – Impacts

In the absence of accepted standards for determining the efficiency of a power plant, Staff considered the effectiveness of each of the steps involved in converting the sun's energy into electricity:

- Mirrors and/or collectors capture the sun's rays.
- Solar energy is converted to heat.
- Heat is converted to electricity (typically in a heat engine such as a steam turbine generator or a Stirling Engine-powered generator.)

According to Staff, the effectiveness of each of these steps depends on the specific technology employed, as the product of the three steps determines the power plant's overall solar efficiency. (Ex. 300, p. 7.2-2.) Staff recognized that there is a wide range of environmental issues to analyze when comparing the merits and impacts of different technologies and therefore performed a relative comparison of land use efficiency from the perspective of both capacity and annual energy production, using the ISEGS Project and five other solar projects that were, or are, in the Commission's power plant siting process. (Ex. 300, pp. 7.2-2 to 7.2-3, 7.2-6 to 7.2-10.)

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Power Plant Efficiency Table 1 below summarizes the results:

EFFICIENCY Table 1 — Solar Land Use Efficiency

Project	Generating Capacity (MW net)	Annual Energy Production (MWh net)	Annual Fuel Consumption (MMBtu LHV)	Footprint (Acres)	Land Use Efficiency (Power-Based) (MW/acre)	Land Use Efficiency (Energy–Based) (MWh/acre-year)	
						Total	Solar Only[1]
Ivanpah SEGS (07-AFC-5)	400	960,000	432,432	3,744	0.11	256	238
Carrizo Energy (07-AFC-8)	177	375,000	0	640	0.28	586	586
Beacon Solar (08-AFC-2)	250	600,000	36,000	1,321	0.19	454	450
SES Solar Two (08-AFC-5)	750	1,620,000	0	6,500	0.12	249	249
SES Solar One (08-AFC-13)	850	1,840,000	0	8,200	0.11	224	224
Avenal Energy (08-AFC-1)[2]	600	3,023,388	24,792,786	25	24.0	120,936	N/A

[1] Net energy output is reduced by natural gas-fired combined cycle proxy energy output; see **EFFICIENCY Appendix A**.
[2] Example natural gas-fired combined cycle plant.

While the table shows that employing a less land-intensive solar technology such as the Compact Linear Fresnel Reflector technology proposed for the Carrizo project or the parabolic trough technology proposed by the Beacon project would potentially reduce land impacts by about 50 percent, the **Alternatives** section of this Decision shows that no alternative solar technology was found to offer reduced impacts as compared to the ISEGS technology.

As a result, Staff concluded that because ISEGS will use solar energy potential from a site that is currently not being harnessed for power production, the project will not result in a less efficient use of the site's solar energy potential than is currently occurring. (Ex. 300, p. 7.2-9.)

Based on the uncontroverted evidence, we make the following findings and reach the following conclusions:

FINDINGS OF FACT

1. ISEGS will provide approximately 400 MW of electrical power, using solar energy to generate up to 95 percent of its capacity and natural gas to generate up to five percent of its capacity.

2. ISEGS will not require the development of new fuel supply resources.

3. ISEGS will consume natural gas in as efficient a manner as practicable.

4. The evidence contains a comparative analysis of alternative fuel sources and generation technologies, none of which is superior to the proposed project at meeting project objectives in an efficient manner.

5. The ISEGS will use solar energy potential from a site that is currently not being harnessed for power production. Thus, from an efficiency perspective, ISEGS would not result in a less efficient use of the site's solar energy potential than is currently occurring.

6. No Federal, State, or local laws, ordinances, regulations, or standards apply to the efficiency of this project.

CONCLUSIONS OF LAW

1. We therefore conclude that the Ivanpah Solar Electric Generating System will not create adverse effects upon energy supplies or resources, require additional sources of energy supply, or consume energy in a wasteful or inefficient manner.

2. No Conditions of Certification are required for this topic area.

C. POWER PLANT RELIABILITY

We must determine whether the project will be designed, sited, and operated to ensure safe and reliable operation. [Pub. Res. Code, § 25520(b); Cal. Code Regs., tit. 20 § 1752(b)(2).] However, there are no LORS that establish either power plant reliability criteria or procedures for attaining reliable operation.

The responsibility for maintaining system reliability falls largely to control area operators such as the California Independent System Operator (CAISO) that purchase, dispatch, and sell electric power throughout the State. The CAISO has begun to establish specific criteria for each load-serving entity under its jurisdiction to help the entities decide how much generating capacity and ancillary services to build or purchase. Load serving entities then issue power purchase agreements to satisfy these needs.

The CAISO criteria are designed to maintain system-wide reliability. However, it is possible that, if numerous power plants operated at reliability levels sufficiently lower than historical levels, the assumptions used by CAISO to ensure system reliability would prove invalid. Therefore, to ensure adequate system reliability, we examine whether individual power plants will be built and operated to the traditional level of reliability reflected in the power generation industry because, where a power plant compares favorably to industry norms, it is not likely to degrade the overall reliability of the electric system it serves. (Ex. 300, p. 7.3-2.) The evidence presented on this topic was uncontested. (12/14/09 RT 55, 62 to 63, 305-307; Exs. 4; 5; 7; 20; 21; 28; 29; 30; 31; 65, §1c, 300 pp. 7.3-1 to 7.3-8.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

ISEGS is expected to achieve an equivalent availability factor of 92 to 98 percent. The availability factor for a power plant is the percentage of time that it is available to generate power. Both planned and unplanned outages subtract from a plant's availability. For practical purposes, a reliable power plant is one that is available when called upon to operate. The evidence shows that delivering acceptable reliability entails: (1) adequate levels of equipment availability; (2) plant maintainability with scheduled maintenance outages; (3) fuel and water availability; and, (4) resistance to natural hazards.

The record, summarized below, reflects Staff's evaluation of the proposed project against typical industry norms as a benchmark for assessing plant reliability.

1. Equipment Availability

Equipment availability for ISEGS will be ensured by use of appropriate quality assurance/quality control (QA/QC) programs during design, procurement, construction, and operation of the plant and by providing adequate maintenance and repair of the equipment and systems. The project owner will use a QA/QC program typical in the power industry. Equipment will be purchased from qualified suppliers and the project owner will perform receipt inspections, test components, and administer independent testing contracts. (Ex. 300, pp. 7.3-3 to 7.3-4.) To ensure these measures are taken, we have incorporated appropriate Conditions of Certification in the **Facility Design** section of this Decision.

2. Plant Maintainability

ISEGS would operate only when the sun is shining. This limited operation allows adequate opportunity for needed maintenance. Furthermore, there will be an appropriate redundancy of function for the project. Because the project consists of three independent steam turbine generators, it is inherently reliable. A single equipment failure could not disable more than one of the three ISEGS plants, which would allow the other two plants to continue to generate at their full output. All other major plant systems are also designed with adequate redundancy to ensure their continued operation if equipment fails. The record shows that the project's proposed equipment redundancy would be sufficient for its reliable operation.

The project owner will establish a maintenance program typical of the power generation industry and based on recommendations from the various equipment manufacturers. This will encompass both preventive and predictive maintenance techniques. Maintenance outages will be planned for periods of low electricity demand. The evidence establishes that the planned maintenance measures will ensure acceptable reliability. (Ex. 300, p. 7.3-4.)

3. Fuel and Water Availability

For any power plant the long-term availability of fuel, and water for cooling or process use, is necessary to ensure reliability. ISEGS will use natural gas supplied by Kern River Gas Transmission Company (KRGTC). This fuel will be supplied via a new six mile long pipeline connected to KRGTC's existing pipeline.

The evidence establishes that this line offers access to adequate supplies of gas to meet the project's needs. (Ex. 300, pp. 7.3-4 to 7.3-5.)

ISEGS will use well water for domestic and industrial water needs. The wells would be connected to the project via a 570-foot water line to Ivanpah 2, from which the line would be extended to each plant. Air-cooled condensers will be used to minimize process water use associated with cooling. Package treatment plants will be used to provide potable water for drinking and sanitary uses. These sources represent a reliable supply of water for the project. (Ex. 300, p. 7.3-5.)

4. Natural Hazards

ISEGS is within Seismic Risk Zone 3. The project will be designed and constructed to the latest appropriate LORS. By implementing these seismic design criteria, the project is anticipated to perform at least as well as, and perhaps better than, existing plants in the electric power system. We have adopted Conditions of Certification in the **Facility Design** section to ensure this occurs.

The site does not lie within a 100- or 500-year floodplain. Thus, the record establishes that there should be no significant concerns with the plant's functional reliability due to flooding. (Ex. 300, pp. 7.3-5 to 7.3-6.)

5. Comparison to Industry Norms

The North American Electric Reliability Corporation (NERC) maintains industry statistics for availability factors and other related reliability data. NERC currently reports summary generating unit statistics for the years 2002 through 2006. The statistics demonstrate an equivalent availability factor of 85.07 percent as the generating unit average for natural gas units of 400 to 599 MW. (Ex. 300, p. 7.3-6). The project will use triple-pressure, condensing steam turbine technology, which has been on the market for several years. Thus, the steam turbine technology is expected to outperform many of the various gas turbines that make up the NERC figure. Thus, we are persuaded that ISEGS will likely exceed industry norms in this regard and reach its predicted annual availability factor of 92 to 98 percent.

Finally, the evidence shows that the project would help serve the need for renewable energy in California, as 95 percent of the generated electricity would

be produced by a reliable source of solar energy that is available during the hot summer afternoons, when power is needed most. Small natural gas-fired boilers would be used to bring the system up to operating temperature in the morning and periodically to keep system temperatures up when clouds briefly block the sunlight. These boilers are expected to contribute to no more than 5 percent of ISEGS' average annual energy. (Ex. 300, p. 7.3-7.)

FINDINGS OF FACT

Based on the uncontested evidence, we make the following findings:

1. No federal, state, or local/county LORS apply to the reliability of ISEGS

2. A project's reliability is acceptable if it does not degrade the reliability of the utility system to which it is connected.

3. The North American Electric Reliability Corporation reports that for the years 2002 through 2006, gas turbine units of 400 to 500 MW exhibited an availability factor of 85.07 percent.

4. An availability factor of 92 to 98 percent is achievable by the ISEGS.

5. Implementation of Quality Assurance/Quality Control (QA/QC) programs during design, procurement, construction, and operation of the ISEGS plants, as well as adequate maintenance and repair of the equipment and systems, will ensure the project is adequately reliable.

6. Appropriate Conditions of Certification included in the **FACILITY DESIGN** portion of this Decision ensure implementation of the QA/QC programs and conformance with seismic design criteria.

7. The project's fuel and water supply will be reliable.

8. The project will meet or exceed industry norms for reliability, including reliability during seismic events, and will not degrade the overall electrical system.

CONCLUSION OF LAW

1. We therefore conclude that ISEGS will meet industry norms and not degrade the overall reliability of the electrical system. No Conditions of Certification are required for this topic area.

D. TRANSMISSION SYSTEM ENGINEERING

The Commission's jurisdiction includes "…any electric power line carrying electric power from a thermal power plant …to a point of junction with an interconnected transmission system." (Pub. Res. Code, § 25107.) The Commission assesses the engineering and planning design of new transmission facilities associated with a proposed project to ensure compliance with applicable law. The record indicates that the Applicant in this case accurately identified all necessary interconnection facilities.

The California Independent System Operator (CAISO) is responsible for ensuring electric system reliability for participating entities, and determines both the standards necessary to achieve system reliability and whether a proposed project conforms to those standards. The Commission works in conjunction with the CAISO in assessing a project.

Commission Staff's analysis evaluates the project transmission lines and equipment, both from the power plant up to the point of interconnection with the existing transmission network as well as upgrades beyond the interconnection that are attributable to the project. Staff relies upon the responsible interconnecting authority for analysis of impacts on the transmission grid, as well as for the identification and approval of new or modified facilities required downstream from the proposed interconnection for mitigation purposes. (Ex. 300, pp. 7.4-1 – 7.4-2.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

The 370 megawatt (MW) ISEGS project would interconnect to Southern California Edison's (SCE's) proposed 220 kV Ivanpah substation near the Nevada border, in San Bernardino County, California. ISEGS will develop in three phases, one 120 MW phase known as Ivanpah #1, and two 125 MW phases known as Ivanpah #2 and #3. Construction is planned to take place over approximately 48 months.

ISEGS is a solar concentrating thermal power plant, based on distributed power tower and heliostat mirror technology. The heliostat fields focus solar energy on the power tower receivers near the center of each of the heliostat arrays. The heliostat mirrors would be asymmetrically arranged around each solar power tower. Each mirror will track the sun throughout the day and reflect the solar energy to the receiver boiler within the power tower. In each plant, one Rankine-

cycle reheat steam turbine receives live steam from the solar boilers and reheat steam from one solar reheater-located in the power block at the top of its own power tower. Each of the three ISEGS projects would connect to its own 115 kV switchyard and from there to a proposed SCE Ivanpah 115/220 kV substation which would connect to the SCE system by looping an existing transmission line into the new substation. (Ex. 300, p. 7.4-4.)

For the interconnection of this proposed project to the grid, the interconnecting utility (SCE) and the control area operator (California ISO) are responsible for ensuring grid reliability. These two entities determine the transmission system impacts of the proposed project and any mitigation measures needed to ensure system conformance with utility reliability criteria, National Electric Reliability Corporation (NERC) planning standards, Western Electricity Coordinating Council (WECC) reliability criteria, and California ISO reliability criteria. System impact and facilities studies are used to determine the impacts of the proposed project on the transmission grid.

The system impact studies were performed by SCE at the request of the Applicant, to identify the transmission system impacts of Ivanpah #1, #2, and #3 on SCE's 115/220/500-kV system. The studies included power flow, sensitivity, and short circuit studies, and transient and post-transient analyses (Ivanpah #1, #2 and #3, 2008a, System Impact Studies). The studies modeled the proposed project for a net output of 100 MW for Ivanpah #1 and #2, 200 MW for Ivanpah #3. The base cases included all CAISO approved major SCE transmission projects, the transmission system for the Los Angeles Department of Water and Power, and major path flow limits of Southern California Import Transmission, East-Of-River, and West-of-River. The studies considered light load conditions with generation patterns and Path 46 imports maximized to identify the extent of potential congestion and fully stress the SCE system in the area where the Ivanpah project phases are interconnecting. The detailed study assumptions are described in the studies. The power flow studies were conducted with and without Ivanpah phases connected to SCE's grid at the proposed Ivanpah Substation, using 2013 heavy summer and 2013 light spring base cases. (Ex. 300, pp. 7.4-5 – 7.4-6.)

1. Switchyard and Interconnection Facilities

Each of the Project's three generating units (1, 2, and 3) would be connected to the low side of its dedicated 13.8/115 kV generator step-up (GSU) transformer through 25 kV, 7,000-ampere gas-insulated (SF6) breaker. The high side of the

generator step-up transformer would be connected to the project's switchyard via 115 kV, 1200-ampere disconnect switch. The step-up transformer for the steam turbine generating unit would be rated at 13.8/115 kV and 72/96/120 megavolt ampere (MVA). Each project switchyard bay will consist of a 115 kV, 1200A single circuit breaker and two 1200A disconnect switches. The switchyard circuit breaker would interconnect to an overhead 115kV single circuit transmission line via 1200A disconnect switch. Each of the three phases will connect to a new Ivanpah substation via its own dedicated 115 kV generator tie line.

The Ivanpah #1 115 kV generator tie line would be approximately 5,800 feet long, built with 477 kcmil ACSR conductors and supported by single-pole structures. The Ivanpah #2 and #3 generator tie lines would share the same poles for the last 1,400 feet of their routes before they interconnect to SCE's Ivanpah Substation. The Ivanpah #2 generator would connect to the Ivanpah Substation through a 115 kV, 3,900 foot-long single circuit generator tie line built with the last 1,400 feet merged with the Ivanpah #3 generator tie line to create a 1,400 feet long, overhead double circuit line prior to entering the Ivanpah Substation. The Ivanpah #3 generator tie line would be an approximately 14,100 feet long, single circuit, 115 kV line built with 1510 kcmil ACSR and would merge into a 115 kV double circuit with the Ivanpah #2 generator tie line.

SCE's proposed Ivanpah Substation would use a double-bus breaker-and-a half configuration with 3 bays and 5 positions for outgoing transmission lines. The Ivanpah Substation would consists of 115 kV, 1200A circuit breakers, 115 kV disconnect switches and other switching gear that will allow delivery of the project's output to the SCE grid. The existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115 kV line would loop in and out through the proposed Ivanpah Substation to interconnect the project to the SCE transmission grid. (Ex. 300, pp. 7.4-4 – 7.4-5.)

Compliance with Condition of Certification **TSE-5** will ensure these facilities comply with LORS.

2. Study Results

   a. Power Flow Study Results and Mitigation Measures (Ivanpah #1 and #2)

The power flow study determined that the system between Mountain Pass and Eldorado substation is inadequate to accommodate the full output of all generation projects queued ahead of the Ivanpah #1 and #2 power plants.

Base Case Conditions (N-0): Under base case conditions, a portion of the Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115 kV line as well as the existing 115/220 kV transformer at Eldorado were found to be loaded beyond the maximum allowable limits.

Mitigation:

- Removal of approximately 36 miles of a portion of the Eldorado – Ivanpah leg of the existing Eldorado-Baker-Cool Water–Dunn Siding-Mountain Pass 115 kV line and construction of a new 36 mile long, 220 kV double circuit line, with 1590 kcmil ACSR conductors, initially energized at 115 kV.

- Replacement of the existing 115/220 kV, 102 MVA transformer bank at the Eldorado Substation with 115/220 KV, 280 MVA bank.

(Ex. 300, pp. 7.4-6 – 7.4-7.)

b. Power Flow Study Results and Mitigation Measures (Ivanpah #3)

The power flow study determined that the system between Ivanpah and Eldorado substation is inadequate to accommodate the full output of all generation projects queued ahead of the Ivanpah #3 power plant.

Base Case Conditions (N-0): Under the base case conditions, the study determined that the modified Eldorado 115/220 kV transformer bank is insufficient to accommodate Ivanpah #3. The existing Eldorado substation design does not provide the ability to install an additional 115/220 kV transformer bank without causing significant changes at the site. Adding a second transformer bank at the Eldorado substation is not a viable alternative.

Mitigation: An additional transformer bank should be installed at proposed Ivanpah substation to increase the operating voltage from 115 kV to 220 kV of the Eldorado-Ivanpah 220 kV transmission line. This will also require the construction of two new 220 kV line positions on the west side of Eldorado substation within the existing fence line.

With the additional upgrades triggered by Ivanpah #3, the study identified the continued need for a Special Protection System (SPS) in order to mitigate

thermal overloads identified under N-1 contingency analysis. The study did not identify any N-2 thermal overloads.

Single Outage Contingency (N-1): The loss of the new 36-mile Eldorado-Ivanpah 220 kV transmission line under N-1 contingency conditions would disconnect the Ivanpah and Mountain Pass areas from the Eldorado substation thereby triggering voltage collapse and thermal overload problems.

Mitigation: A previously implemented SPS will need to be modified to reflect the changes associated with the facility upgrades triggered by Ivanpah #3. The SPS should be capable of tripping the Mountain Pass 115 kV line, the new Ivanpah substation, the new Ivanpah 220 kV transmission line and Ivanpah #3.

Single Outage Contingency (N-1): Loss of one Ivanpah 115/220kV transformer bank results in loading the remaining transformer bank beyond its maximum emergency capability.

Mitigation: Modify a previously implemented SPS to be capable of tripping Mountain Pass 115 kV new Ivanpah substation, New Ivanpah 220 kV transmission line or Ivanpah #3 of the project under loss of one Ivanpah 115/220 kV transformer bank by opening the corresponding unit circuit breaker.
(Ex. 300, p. 7.4-7.)

c. Transient Stability Results

Transient stability studies identified that the Ivanpah #1, #2 and #3 power plants steam generators experience transient instability under 15 cycle closed in (three-phase-to-ground) system faults located at or near the proposed Ivanpah 115kV substation. To mitigate the transient stability problem, the following up grades are proposed:

- Upgrade the SCE 115 kV relay protection near the proposed Ivanpah substation to provide for primary protection fault clearing time of less than 8 cycles.

- Install out-of step protection on the Ivanpah #1, #2 and #3 steam turbine-generators. (Ex. 300, p. 7.4-8.)

d. Post-Transient Stability Results

Depending on the amount of generation resource on line, loss of either Eldorado-Ivanpah transmission line or loss of the 115/220 kV transformer at Eldorado resulted in a significant voltage deviation including a voltage collapse, in the Dunn Siding and Baker substation areas. To mitigate this problem, the following reliability upgrade is proposed:

- Install a Special Protection System (SPS) that trips the Ivanpah #1, #2 and #3 projects under outages of transmission facilities connecting the proposed Ivanpah substation to the Eldorado substation (transmission line and transformer bank at Eldorado substation). (Ex. 300, p. 7.4-8.)

e. Short-Circuit Duty Study Results

Short circuit studies were performed to determine the degree to which the addition of Ivanpah project increases fault duties at SCE substations, and other 115 kV, 220 kV, and 220 kV busses within the study area. The busses at which faults were simulated, the maximum three-phase and single-line-to-ground fault currents at these busses both with and without the project, and information on the breaker duties at each location are summarized in the Short Circuit Study results tables of the System Impact Study Report.

The results of the three-phase-to-ground and single-phase-to-ground short-circuit duty studies identified that three 220kV 50kA circuit breakers at the Lugo Substation will need to be replaced and that two 220 kV 50kA circuit breakers also at the Lugo Substation will need to be upgraded to 63 kA rating by installing Transient Recovery Voltage (TRV) capacitor banks. Additionally, the Eldorado 220 kV substation will need to be upgraded to 80 kA design standard as the current 63 KA capability was identified to be exceeded by a queued ahead generation projects. The breaker upgrades would occur within the fence line of existing substations and would not trigger CEQA review. Detailed Short Circuit study results will be provided as a part of the Facilities Study. (Ex. 300, p. 7.4-8.)

3. Environmental Impacts

With the exception of the removal of approximately 36 miles of a portion of the Eldorado – Ivanpah leg of the existing Eldorado-Baker-Cool Water–Dunn Siding-Mountain Pass 115 kV line and construction of a new 36 mile long, 220 kV double circuit line in its place and provision of communications lines to facilitate SPS control of the ISEGS facility, the improvements necessary to integrate

ISEGS into the power grid will take place within existing switchyard facilities and are not expected to have any significant environmental impacts.

The Eldorado – Ivanpah segment removal/replacement occurs beyond the first point of connection to the grid and is not subject to the Energy Commission's jurisdiction. Nonetheless, as a consequence of approval of ISEGS, we must analyze its environmental effects and suggest measures that its approving authorities can take to mitigate any potential impacts. Commission staff performed that analysis in its supplemental testimony (Ex. 304). We refer readers to that Exhibit for the details of the construction activities and recommended mitigation measures. With one exception, Staff recommends that we find that the segment removal/replacement project will comply with all LORS and will not cause a significant environmental impact. The exception is in the area of biological resources, specifically special-status plants. Due to incomplete information about the numbers of such plants and their distribution, it cannot be said with certainty that it will be possible to design and construct the project without the loss of some special-status plants. Further study, conducted in connection with the actual permitting of the work should result in a definitive answer and might, if known to us at this point, change our conclusion regarding impact significance. Lacking that information at this point, we shall assume that a significant impact may occur and make our decision on the ISEGS application accordingly. (Ex. 304, pp. 9-31 – 9-36, 9-65.)

4. Compliance with LORS

The studies indicate that the three phases of the project would comply with NERC/WECC planning standards and CAISO reliability criteria. The Applicant will design and fund construction of the proposed 220 kV Ivanpah substation and a new 36-mile long segment of Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass transmission line between Eldorado and Ivanpah Substations. Compliance with the proposed Conditions of Certification will assure that the project meets the requirements and standards of all applicable LORS.

5. Public Comment

There was no public comment on transmission systems engineering.

FINDINGS OF FACT

Based on the evidence, we make the following findings and conclusions:

1. ISEGS will consist of one 120 MVA Steam turbine generating unit and two 125 MVA Steam turbine generating units resulting in a maximum output of 370 MW.

2. ISEGS will connect interconnect to SCE's proposed 220 kV Ivanpah substation near the Nevada border via a 115-kV transmission line. That substation is the first point of connection for ISEGS.

3. SCE and the CAISO performed an Interconnection System Impact Study (SIS) of the ISEGS which included power flow, sensitivity, and short circuit studies, and transient and post-transient analyses.

4. The SIS indentified various measures that will mitigate any negative effects that the introduction of the ISEGS units to the power grid would have upon the grid.

5. Among the SIS identified mitigation measures is the removal of an approximately 36 mile portion of the Eldorado – Ivanpah leg of the existing Eldorado-Baker-Cool Water–Dunn Siding-Mountain Pass 115 kV line and construction of a new 36-mile, 220 kV double circuit line to replace it, along with the running of communication cables to facilitate remote control of ISEGS units. The line removal and replacement activity occurs beyond the first point of interconnection.

6. The evidence analyzes the potential environmental effects of the line removal and replacement and finds no effects except that special status plants may be harmed during the construction activities, resulting in an unmitigable significant impact. Mitigation measures are recommended for other potentially significant impacts and would reduce those impacts to insignificant levels.

7. The study shows that, with the identified mitigation, the project interconnection will comply with NERC/WECC planning standards and applicable reliability criteria.

8. The Conditions of Certification are adequate to ensure that ISEGS does not adversely impact the transmission grid.

CONCLUSIONS OF LAW

1. The proposed transmission lines and terminations to serve ISEGS are acceptable and would comply with all applicable LORS. The project interconnection to the grid would not require additional downstream transmission facilities (other than the removal of an approximate 36-mile portion of the Eldorado – Ivanpah leg of the existing Eldorado-Baker-Cool Water–Dunn Siding-Mountain Pass 115 kV line and construction of a new

36-mile long, 220 kV double circuit line) that requires CEQA review. That line removal and replacement, as it is past the point of first interconnection, is not within the Energy Commission's jurisdiction. Any potentially significant environmental impacts of that project can and should be mitigated to insignificant levels by the requirement of appropriate design changes or mitigation measures by the agencies having approval authority over the project. Appropriate mitigation measures are recommended in the evidence (Exhibit 304).

2. With the implementation of the various mitigation measures specified in this Decision, the proposed transmission interconnection for the project will not cause or contribute to significant direct, indirect, or cumulative impacts except that removal and construction of the portion of the Eldorado – Ivanpah line described above could result in the loss of special-status plant species, resulting in a significant impact.

3. The Conditions of Certification below ensure that the transmission-related aspects of ISEGS will be designed, constructed, and operated in conformance with the applicable laws, ordinances, regulations, and standards identified in the appropriate portion of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

TSE-1 The project owner shall furnish to BLM's Authorized Officer and the Compliance Project Manager (CPM) and to the Chief Building Official (CBO) a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by BLM and Energy Commission staff, the project owner shall provide designated packages to BLM's Authorized Officer and the CPM when requested.

Verification: At least 60 days prior to the start of construction (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO, BLM's Authorized Officer and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM, BLM's Authorized Officer and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

TRANSMISSION SYSTEM ENGINEERING Table 1
Major Equipment List

Breakers
Step-Up Transformer
Switchyard
Busses
Surge Arrestors
Disconnects
Take Off Facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Grounding System

TSE-2 Prior to the start of construction, the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical engineer. (Business and Professions Code Sections 6704 et seq. require state registration to practice as a civil engineer or structural engineer in California.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California-registered electrical engineer. The civil, geotechnical or civil, and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project

owner shall notify BLM's Authorized Officer and the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days prior to the start of rough grading (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify BLM's authorized officer and the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify BLM's Authorized Officer and the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action (California Building Code, 1998, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to BLM's Authorized Officer and the CPM within 15 days of receipt. If disapproved, the project owner shall advise BLM's Authorized Officer and the CPM, within five days, the reason for disapproval, and the revised corrective action required obtaining the CBO's approval.

TSE-4 For the power plant switchyard, outlet line, and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure

compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

- Receipt or delay of major electrical equipment;
- Testing or energization of major electrical equipment; and
- The number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days prior to the start of each increment of construction (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit to the CBO for review and approval the final design plans, specifications, and calculations for equipment and systems of the power plant switchyard, outlet line, and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send BLM's Authorized Officer and the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations as determined by the CBO.

A. The Ivanpah 1 will be interconnected to the SCE grid via a 115 kV segment approximately 5,800 feet long single circuit.

   The Ivanpah #2 will be interconnected to the SCE grid via a 115 kV single circuit segment approximately 3900 feet long and an approximately 1400 feet long double circuit 115 kV generator tie-line.

   The Ivanpah #3 115 kV generator tie line would be approximately 14,100 feet long which would merge into a 115kV double circuit with the Ivanpah #2 generator tie line.

   The proposed Ivanpah substation would use a double bus breaker-and a half configuration with 3-bays and 5 positions or other configuration as may be approved by SCE.

B. The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 and General Order 98 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36, and 37 of the "High Voltage Electric Safety Orders", California ISO standards, National Electric Code (NEC), and related industry standards.

C. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

D. Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.

E. The project conductors shall be sized to accommodate the full output from the project.

F. Termination facilities shall comply with applicable SCE interconnection standards.

G. The project owner shall provide to BLM's Authorized Officer and the CPM:

   a. The final Detailed Facility Study (DFS) including a description of facility upgrades, operational mitigation measures, and/or Special Protection System (SPS) sequencing and timing if applicable,

   b. Executed project owner, Transmission System Operator and CAISO Large Generator Interconnection Agreement (LGIA).

Verification: At least 60 days prior to the start of construction of transmission facilities (or a lessor number of days mutually agreed to by the project owner and CBO), the project owner shall submit to the CBO for approval:

1. Design drawings, specifications, and calculations conforming with CPUC General Order 95 and General Order 98 or NESC; Title 8, California Code of Regulations, Articles 35, 36, and 37 of the "High Voltage Electric Safety Orders"; NEC; applicable interconnection standards, and related industry standards for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment.

2. For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst-case conditions,"[8] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC; Title 8, California Code of Regulations, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; NEC; applicable interconnection standards, and related industry standards.

[8] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

3. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** A) through G) above.

4. The final Detailed Facility Study, including a description of facility upgrades, operational mitigation measures, and/or SPS sequencing and timing if applicable, shall be provided concurrently to BLM's Authorized Officer and the CPM.

TSE-6 The project owner shall provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California transmission system as required in the LGIA.

Verification: The project owner shall provide copies of the CAISO notice to BLM's Authorized Officer and the CPM when it is sent to the CAISO. A report of the conversation with the CAISO shall be provided electronically to BLM's Authorized Officer and the CPM one day before synchronizing the facility with the California transmission system for the first time.

TSE-7 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent BLM authorized officer, CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC; Title 8, CCR, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; applicable interconnection standards; NEC; and related industry standards. In case of non-conformance, the project owner shall inform BLM's Authorized Officer, the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to BLM's Authorized Officer, the CPM and CBO:

1. "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC; Title 8, California Code of Regulations, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; applicable interconnection standards; NEC; and related industry standards, and these conditions shall be provided concurrently.

2. An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for BLM's Authorized Officer or CPM audit as set forth in the "Compliance Monitoring Plan."

3. A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge

E. TRANSMISSION LINE SAFETY AND NUISANCE

The ISEGS generation tie lines must be constructed and operated in a manner that protects environmental quality, assures public health and safety, and complies with applicable law. This portion of the Decision assesses the potential for the generation tie lines to create the various impacts mentioned below, as well as whether mitigation measures are required to reduce any adverse effects to insignificant levels. The analysis of record takes into account both the physical presence of the lines and the physical interactions of their electric and magnetic fields. (Ex. 300, p. 6.11-2.) The evidence submitted by Applicant and Staff was uncontested. (12/14/2009 RT 303 - 07; Exs. 1; 2; 4; 5; 65, pp. 21 to 24; 300, § 6.11; 302, p. 4; 303, p. 2.) The "Mitigated Ivanpah 3" submission does not affect project impacts or mitigation for this topic area. (Exs. 88; 315.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

Each of the three facilities (Ivanpah 1-3) comprising the ISEGS Project will interconnect with SCE's power grid. The tie line system consists of the following:

- one new, single-circuit 115-kV overhead generation tie line extending 5,800 feet from the Ivanpah 1 switchyard to the Ivanpah Substation;
- two new single-circuit 115-kV overhead generation tie lines extending from the Ivanpah 2 and Ivanpah 3 switchyards and merging into a double-circuit overhead transmission line at a point 1,400 feet from the Ivanpah Substation before entering it;
- each generating unit's own 115-kV on-site switchyard through which its line will extend towards the Ivanpah Substation;
- project-related reliability upgrades of the area's SCE 115-kV line system; and
- SCE's new 220/115-kV Ivanpah Substation (located between Ivanpah 1 and 2).

The tie line for Ivanpah 3 will be 14,000 feet long; the one for Ivanpah 2 will be 3,900 feet. All three lines and related facilities will be designed, operated, and maintained in keeping with SCE guidelines to ensure line safety and efficiency together with reliability and maintainability. This, in turn, assures compliance with applicable LORS. All the generation tie lines will traverse only uninhabited open space. (Ex. 300, pp. 6.11-4 to 6.11-5; 6.11-11 to 6.11-12.)

Potential impacts from the project's generation tie lines involve aircraft collisions, interference with radio frequency communication, audible noise, hazardous shocks, nuisance shocks, fire danger, and electric and magnetic field (EMF) exposure. Regarding each of these potential impacts, the evidence conclusively establishes the following:

- *Aviation Safety*

Hazards to area aircraft arise from the potential for collision in the navigable airspace. The project site is not located near a major commercial aviation center. The nearest public airport is Jean Airport, located approximately 14 miles northeast of the project site. An additional airport, the Southern Nevada Supplemental Airport, is currently undergoing federal environmental review. The ISEGS Project is located about 7.6 miles southwest of the nearest runway for this proposed facility.

The evidence shows that the project is sufficiently distant from these facilities so as not to pose a hazard. Moreover, the 85-foot height of the line's support structures is well below the 200-foot height threshold of concern for the Federal Aviation Administration. Thus, the project is unlikely to pose a hazard to users of the existing Jean Airport or the proposed airport. (Ex. 300, pp. 6.11-5 to 6.11-6.)

- *Interference with Radio-Frequency Communication*

This potential impact is one of the indirect effects of line operation and is produced by the physical interactions of the electric fields. It arises from corona discharge and is primarily a concern for lines larger than 345-kV. The project's 115-kV lines will be built and maintained according to standard SCE practices aimed at minimizing any interference. Moreover, there are no nearby residential receptors as the lines traverse uninhabited open space. Thus, no radio frequency interference or related complaints are likely. (Ex. 300, pp. 6.11-6 to 6.11.7.)

- *Audible Noise*

This is typically perceived as a characteristic crackling, hissing, or frying sound or hum, especially in wet weather.[1] The noise level depends upon the strength of

[1] In fair weather, audible noise from modern transmission lines is generally indistinguishable from background noise at the edge of a right-of-way 100 or more feet wide. (Ex. 300, p. 6.11-7.)

the 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 project's lines (115-kV) will embody a low corona design to minimize field strengths. It is not expected that the lines will add significantly to the current background noise levels.[2] (Ex. 300, p. 6.11-7.)

- *Hazardous Shocks*

These could result from direct or indirect contact between an individual and the energized line. Compliance with the CPUC's GO-95, as required in Condition of Certification **TLSN-1**, will ensure that adequate measures are implemented to minimize this potential impact. (Exs. 65, p. 23; 300, p. 6.11-8; 302, p. 4.)

- *Nuisance Shocks*

Nuisance shocks are typically caused by direct contact with metal objects electrically charged by fields from an energized line. They are effectively minimized through grounding procedures for all metallic objects within the right-of-way as specified by the National Electrical Safety Code (NESC) as well as the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). This is required in Condition of Certification **TLSN-4**. (*Id.*)

- *Fire Hazards*

Fire can be caused by sparks from the lines' conductors or by direct contact between the lines and nearby trees or other combustible objects. SCE's standard fire prevention and suppression measures, and compliance with the clearance-related aspects of GO-95 as required in Condition of Certification **TLSN-3**, ensure that appropriate fire prevention measures are implemented. (Exs. 65, p. 24; 300, p. 6.11-7.)

- *Exposure to Electric and Magnetic Fields*

Electric and magnetic fields (EMF) occur whenever electricity flows. The possibility of deleterious health effects from exposure to EMF has raised public health concerns about living and working near high-voltage lines. Due to the present scientific uncertainty regarding potential health effects from EMF

[2] Overall project noise levels are discussed in the **Noise** section of this Decision.

exposure, CPUC policy requires reduction of such fields 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. (Ex. 300, pp. 6.11-8 to 6.11-9.)

The CPUC requires each new or modified transmission line in California to be designed according to the EMF-reducing guidelines of the electric utility in the service area involved. EMF fields produced by new lines must be similar to the fields of comparable lines in that service area. To comply with CPUC requirements for EMF management, SCE's specific field strength-reducing measures will be incorporated into the project lines' design and include:

- Increasing the distance between the conductors and the ground to an optimal level;
- Reducing the spacing between the conductors to an optimal level;
- Minimizing the current in the lines; and
- Arranging current flow to maximize the cancellation effects from the interaction of conductor fields. (Ex. 300, pp. 6.11-9 to 6.11-10.)

Applicant calculated the maximum electric and magnetic field intensities expected along all tie line routes.[3] Condition of Certification **TLSN-2** requires that actual field strengths be measured, according to accepted procedures, to insure that the field intensities are similar to those of other SCE lines. These measurements will reflect both the effectiveness of the field reduction techniques used and the ISEGS' potential contribution to area EMF levels. (Ex. 300, pp. 6.11-10 to 6.11-11.)

Since there are no residences in the vicinity of the project's lines, there will not be the long-term human residential EMF exposures primarily responsible for the health concern of recent years. The only project-related EMF exposures of potential significance are the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the immediate vicinity of the lines. These types of exposures are well understood as not being significantly related to an adverse health effect. (Ex. 300, pp. 6.11-12 to 6.11-13.)

[3] Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m) for the electric field and milligauss (mG) for the companion magnetic field. The maximum electric field strength (1.04 kV/m) and the maximum magnetic field intensity (117.14 mG) calculated are similar to those of other SCE 115-kV lines. (Ex. 300, pp. 6.11-10 to 6.11-11.)

Overall, the evidence shows that the project's generation tie lines will be designed, constructed, operated, and maintained in compliance with applicable LORS. Implementation of the Conditions of Certification will ensure that any impacts are reduced to less than significant levels. (Ex. 300, pp. 6.11-11 to 6.11-12.)

FINDINGS OF FACT

Based on the uncontroverted evidence, we make the following findings:

1. The ISEGS Project's generation tie line system includes: one new, single-circuit 115-kV overhead line extending 5,800 feet from the Ivanpah 1 switchyard to the Ivanpah Substation; two new single-circuit 115-kV overhead lines extending from the Ivanpah 2 and Ivanpah 3 switchyards and merging into a double-circuit overhead line at a point 1,400 feet from the Ivanpah Substation before entering it; each generating unit's own 115-kV on-site switchyard through which its line will extend towards the Ivanpah Substation; project-related reliability upgrades for the area's SCE 115-kV line system; and SCE's new 220/115-kV Ivanpah Substation.
2. The evidentiary record includes analyses of potential impacts from the project's generation tie lines involving aircraft collisions, interference with radio frequency communication, audible noise, hazardous shocks, nuisance shocks, fire danger, and EMF exposure.
3. There are no residences along the route of the project's new generation tie lines.
4. The available scientific evidence does not establish that EMF fields pose a significant health hazard to humans.
5. The electric and magnetic fields generated by the project's generation tie lines will be managed to the extent the CPUC considers appropriate, based on available health effects information.
6. The project's generation tie lines will comply with existing LORS for public health and safety.
7. The project's generation tie lines will incorporate standard EMF-reducing measures established by the CPUC and used by SCE.
8. The project owner will provide field intensity measurements before and after line energization to assess EMF contributions from the project-related current flow.

9. The new generation tie lines will not result in significant adverse environmental impacts to public health and safety or cause significant direct, indirect, or cumulative impacts as a result of aviation collisions, radio frequency communication interference, fire danger, nuisance or hazardous shocks, or electric and magnetic field exposure.

CONCLUSIONS OF LAW

1. Implementation of the Conditions of Certification, below, will ensure that the ISEGS Project's generation tie lines comply with all applicable laws, ordinances, regulations, and standards relating to **Transmission Line Safety and Nuisance** as identified in the pertinent portion of **Appendix A** of this Decision.

2. The ISEGS Project's new generation tie lines will not have a significant impact on the environment due to safety and nuisance factors.

CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed generation tie lines to the first point of interconnection according to the requirements of California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2 High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, and Southern California Edison's EMF-reduction guidelines.

Verification: At least 30 days before starting the generation tie lines or related structures and facilities, the project owner shall submit to BLM's Authorized Officer and the Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the lines will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the lines at the points of maximum intensity along the route for which the applicant provided specific estimates. The measurements shall be made before and after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. These measurements shall be completed no later than 6 months after the start of operations.

Verification: The project owner shall file copies of the pre-and post-energization measurements with BLM's Authorized Officer and the CPM within 60 days after completion of the measurements.

TLSN-3 The project owner shall ensure that the rights-of-way of the generation tie lines are kept free of combustible material, as required under the provisions of section 4292 of the Public Resources Code and section 1250 of Title 14 of the California Code of Regulations.

Verification: During the first 5 years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the rights-of-way and provide such summaries in the Annual Compliance Report provided to BLM's Authorized Officer and the CPM.

TLSN-4 The project owner shall ensure that all permanent metallic objects within the rights-of-way of the project-related generation tie lines are grounded according to industry standards regardless of ownership.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to BLM's Authorized Officer and the CPM a letter confirming compliance with this condition.

V. PUBLIC HEALTH AND SAFETY

A. GREENHOUSE GAS (GHG) EMISSIONS

1. INTRODUCTION AND SUMMARY

There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. Man-made emissions of greenhouse gases, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Indeed, the California Legislature has found that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California" (Cal. Health & Safety Code, sec. 38500, division 25.5, part 1).

ISEGS, as a solar energy generation project, is exempt from the mandatory GHG emission reporting requirements for electricity generating facilities as currently required by the California Air Resources Board (ARB) for compliance with the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.) (ARB 2008a). However, the project may be subject to future reporting requirements and GHG reductions or trading requirements as these regulations become more fully developed and implemented.

In addition, as a solar project with a nightly shutdown that would operate at less than 60 percent of capacity, it is not subject to the requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2900 et. seq.). Nonetheless, the ISEGS would easily comply with the requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard.

The generation of electricity using fossil fuels, even in a back-up generator at a thermal solar plant, produces air emissions known as greenhouse gases in addition to the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system.

The greenhouse gases are carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFC), and perflurocarbons (PFC). CO_2 emissions are far and away the most common of these emissions; as a result, even though the other GHGs have a greater impact on climate change on a per-unit basis, GHG emissions are often expressed in terms of "metric tons of CO_2-equivalent" ($MTCO_2e$) for simplicity. (Ex. 300, p. 6.1-63.)

Since the impact of the GHG emissions from a power plant's operation has global, rather than local, effects, those impacts should be assessed not only by analysis of the plant's emissions, but also in the context of the operation of the entire electricity system of which the plant is an integrated part. Furthermore, the impact of the GHG emissions from a power plant's operation should be analyzed in the context of applicable GHG laws and policies, such as AB 32 (described below).

In this part of the Decision we consider:

- Whether ISEGS GHG construction emissions will have significant impacts;

- Whether ISEGS operation will be consistent with the state's GHG policies and will help achieve the state's GHG goals by causing a decrease in overall electricity system GHG emissions.

2. Policy and Regulatory Framework

We begin with the simple observation that, as the Legislature stated 35 years ago, "it is the responsibility of state government to ensure that a reliable supply of electrical energy is maintained at a level consistent with the need for such energy for protection of public health and safety, for promotion of the general welfare, and for environmental quality protection." (Pub. Res. Code, § 25001.) Today, as a result of legislation, the most recent addition to "environmental quality protection" is the reduction of GHG emissions. Several laws and statements of policy are applicable.

a. AB 32

The foundation of California's GHG policy is the California Global Warming Solutions Act of 2006. [Assembly Bill 32, codified in Health & Saf. Code, § 38560 et seq. (hereinafter AB 32).] AB 32 requires the California Air Resources Board ("CARB") to adopt regulations that will reduce statewide GHG emissions, by the year 2020, to the level of statewide GHG emissions that existed in 1990.

Gubernatorial Executive Order S-3-05 (June 1, 2005) requires a further reduction, to a level 80 percent below the 1990 GHG emissions, by the year 2050.

Along with all other regulatory agencies in California, the Energy Commission recognizes that meeting the AB 32 goals is vital to the state's economic and environmental health. While AB 32 goals have yet to be translated into regulations that limit GHG emissions from generating facilities, the scoping plan adopted by ARB relies heavily on cost-effective energy efficiency and demand response, renewable energy, and prioritization of generation resources to achieve significant reductions of emissions in the electricity sector by 2020. Even more dramatic reductions in electricity sector emissions would likely be required to meet California's 2050 greenhouse gas reduction goal. Facilities under our jurisdiction, such as ISEGS, must be consistent with these policies.[1]

b. Renewable Portfolio Standard

California statutory law requires the state's utilities to be obtaining at least 20 percent of their electricity supplies from renewable sources by the year 2010. (Pub. Util. Code, § 399.11 et seq.) Gubernatorial Executive Orders increase the requirement to 33 percent by 2020 and require CARB to adopt regulations to achieve the goal. [Governor's Exec. Orders Nos. S-21-09 (Sept. 15, 2009), S-14-08 (Nov. 17, 2008).]

c. Emissions Performance Standard

Senate Bill (SB) 1368 of 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibit utilities from entering into long-term commitments with any base load facilities that exceed an Emission Performance Standard (EPS) of 0.500 metric tonnes of CO_2 per megawatt-hour (this is the equivalent of 1100 pounds of CO_2/MWh). (Pub. Util. Code, § 8340 et seq.; Cal. Code Regs., tit. 20, § 2900 et seq.; CPUC D0701039.) Currently, the EPS is the only LORS that has the effect of limiting power plant GHG emissions. ISEGS is exempt from SB 1368 because it would operate at or below a 60 percent capacity factor.

[1] Of course, ISEGS and all other stationary sources will need to comply with any applicable GHG LORS that take effect in the future.

d. Loading Order

In 2003 the Energy Commission and the CPUC agreed on a "loading order" for meeting electricity needs. The first energy resources that should be utilized are energy efficiency and demand response (at the maximum level that is feasible and cost-effective), followed by renewables and distributed generation, combined heat and power (also known as cogeneration), and finally the most efficient available fossil fuel resources and infrastructure development.[2] CARB's AB 32 Scoping Plan reflects these policy preferences. (California Air Resources Board, Climate Change Scoping Plan, December 2008.)

We now turn to a discussion of whether, and how well, ISEGS would advance these goals and policies. We begin by reviewing the project's emissions both during construction and during operation.

3. GHG Emissions During Construction Of The Facility

Construction of industrial facilities such as power plants involves concentrated on-site activities that result in short-term, unavoidable increases in vehicle and equipment emissions, including greenhouse gases. Construction of the proposed project has three phases, each of which would last about 24 months. There would be a 12–month overlapping period between each phase, which would result in 4 years of continuous construction. The applicant provided a construction emissions estimate that staff used to calculate greenhouse gas emissions for the entirety of the construction activities. The greenhouse gas emissions estimate, presented below in **Greenhouse Gas Table 1,** was converted by staff into $MTCO_2e$ and totaled.

[2] California Energy Commission 2008, *2008 Integrated Energy Policy Report Update*, (IEPR) (CEC-100-2008-008-CMF.)

Greenhouse Gas Table 1
ISEGS Estimated Potential Construction Greenhouse Gas Emissions

Construction Element	***CO_2-equivalent ($MTCO_2e$)*** [a,b]
Off-road Equipment	10,444
Heavy Delivery Trucks	1,925
Construction Worker Transportation	5,410
Construction Total	17,779

Source: Ex. 200, p. 6.1-64, Greenhouse Gas Table 2
[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 **$MTCO_2E$** emissions, over 99 percent, are CO_2 from these combustion sources.

There is no adopted, enforceable federal or state LORS applicable to ISEGS construction emissions of GHG. Nor is there a quantitative threshold over which GHG emissions are considered "significant" under CEQA. Nevertheless, there is guidance from regulatory agencies on how the significance of such emissions should be assessed. For example, the most recent guidance from CARB staff recommends a "best practices" threshold for construction emissions. [CARB, Preliminary Draft Staff Proposal, Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act (Oct. 24, 2008), p. 9]. Such an approach is also recommended on an interim basis, or proposed, by major local air districts.

We understand that "best practices" includes the implementation of all feasible methods to control construction-related GHG emissions. As the "best practices" approach is currently recommended by the state agency primarily responsible not only for air quality standards but also for GHG regulation, we will use it here to assess the GHG emissions from ISEGS construction.

In order to limit vehicle emissions of both criteria pollutants and GHG during construction, ISEGS will use (1) operational measures, such as limiting vehicle idling time and shutting down equipment when not in use; (2) regular preventive maintenance to prevent emission increases due to vehicular engine problems; and (3) use of low-emitting diesel engines meeting federal emissions standards for construction equipment, whenever available. (Ex. 300, p. 6.1-21 to 6.1-22.)

Control measures that we have adopted elsewhere in this Decision to address criteria pollutant emissions would further minimize greenhouse gas emissions to the extent feasible. Also, the requirement that the owner use newer construction equipment will increase fuel efficiency and minimize tailpipe emissions. (see Condition of Certification **AQ-SC5**.)

We find that the measures described above to directly and indirectly limit the emission of GHGs during the construction of ISEGS are in accordance with current best practices. We therefore find that the evidence shows that the GHG emissions from construction activities would not exceed the level of significance. (Ex. 200, p. 6.1-66.)

4. Direct/Indirect Operation Impacts And Mitigation

a. Anticipated Emissions

For this solar project the primary fuel, solar energy, is greenhouse gas free, but there is a natural gas-fired steam boiler for each of the three plants. The proposed ISEGS project would cause GHG emissions from power block maintenance activities, including mirror cleaning and vegetation removal, weekly testing of the emergency generator and firewater pump, one hour per day of operation of each boiler, and employee trips. (Ex. 200, p. 6.1-64) Operations GHG emissions are shown in **Greenhouse Gas Table 2**. All emissions are converted to CO_2-equivalent and totaled.

Greenhouse Gas Table 2
Estimated ISEGS Potential Operating Greenhouse Gas Emissions

	CO_2-equivalent ($MTCO_2e$ [a] per year)
Boilers	25,458
Emergency Generator Engines	346
Fire Pump Engine	15
Maintenance Vehicles	474
Worker Vehicles	1118
Delivery and Waste Haul Vehicles	22
Equipment Leakage (SF_6)	10
Total Project GHG Emissions – $MTCO_2e$ [b]	**27,444**
Facility MWh per year [c]	960,000
Facility GHG Performance ($MTCO_2e$ /MWh)	0.029

Source: Ex. 200, p. 6.1-65, Greenhouse Gas Table 3
[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, are CO_2 from these emission sources.
[c] Approximately a 28 percent capacity factor. BSE2007a.

The proposed project would be permitted, on an annual basis, to emit over 27,000 metric tonnes of CO_2-equivalent per year if operated at its maximum permitted level. ISEGS is a solar project with a nightly shutdown so it will operate less than 60 percent of capacity; therefore, the project is not subject to the requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard. Nonetheless, the ISEGS, at 0.029 $MTCO_2e$ /MWh, would easily meet both.

b. Assessment of Operational Impacts

As we have previously noted, GHG emissions have global, rather than local, impacts. While it may be true that in general, when an agency conducts a CEQA analysis of a proposed project, it does not need to analyze how the operation of the proposed project is going to affect the entire system of projects in a large multi-state region, analysis of the impacts of GHG emissions from power plants requires consideration of the project's impacts on the entire electricity system.

California's electricity system – which is actually part of a system serving the entire western region of the U.S., Canada, and Mexico – is large and complex. Hundreds of power plants, thousands of miles of transmission and distribution lines, and millions of points of electricity demand operate in an interconnected, integrated, and simultaneous fashion. Because the system is integrated, and because electricity is produced and consumed instantaneously, and will continue to be until large-scale electricity storage technologies are available, any change in demand and, most important for this analysis, any change in output from any generation source, is likely to affect the output from all generators (*Committee Guidance on Fulfilling California Environmental Quality Act Responsibilities for Greenhouse Gas Impacts in Power Plant Siting Applications,* CEC-700-2009-004, pp. 20 to 22.) [3] (Hereinafter referred to as "Committee CEQA Guidance")

The California Independent System Operator (CAISO) is responsible for operating the system so that it provides power reliably and at the lowest cost. Thus the CAISO dispatches generating facilities generally in order of cheapest to operate (i.e., typically the most efficient) to most expensive (i.e., typically the least efficient). (*Id*., p. 20.) Because operating cost is correlated with heat rate (the amount of fuel that it takes to generate a unit of electricity), and, in turn, heat rate is directly correlated with emissions (including GHG emissions), when a power plant runs, it usually will take the place of another facility with higher

[3] The report was issued in March 2009 and is found on the Commission website at: **http://www.energy.ca.gov/2009publications/CEC-700-2009-004/CEC-700-2009-004.PDF**

emissions that otherwise would have operated. Due to the integrated nature of the electrical grid, the operational plant and the displaced plant may be hundreds of miles apart (Committee CEQA Guidance, p. 20.) Because one plant's operation could affect GHG emissions hundreds of miles away, the necessity of assessing their operational GHG emissions on a system-wide basis becomes clear.

As California moves towards an increased reliance on renewable energy, non-renewable energy resources will be curtailed or displaced. These potential reductions in non-renewable energy, shown in **Greenhouse Gas Table 3**, could be as much as 36,000 GWh. These predictions are conservative in that the predicted growth in retail sales incorporates the assumption that the impacts of energy efficiency programs are already included in the current retail sales forecast. If, for example, forecasted retail sales in 2020 were lowered by 10,000 GWh due to the success of energy efficiency programs, non-renewable energy needs would fall by an additional 6,700 to 8,000 GWh/year, depending on the RPS level, totaling as much as 45,000 GWh per year of reduced non-renewable energy, depending on the RPS assumed.

Greenhouse Gas Table 3
Estimated Changes in Non-Renewable Energy Potentially Needed to Meet California Loads, 2008-2020

California Electricity Supply	***Annual GWh***	
Statewide Retail Sales, 2008, estimated [a]	265,185	
Statewide Retail Sales, 2020, forecast [a]	308,070	
Growth in Retail Sales, 2008-20	42,885	
Growth in Net Energy for Load [b]	46,316	
California Renewable Electricity	**GWh @ 20% RPS**	**GWh @ 33% RPS**
Renewable Energy Requirements, 2020 [c]	61,614	101,663
Current Renewable Energy, 2008	29,174	
Change in Renewable Energy-2008 to 2020 [c]	32,440	72,489
Resulting Change in Non-Renewable Energy [d]	13,876	(-36,173)

Source: Ex. 200, p. 6.1-67, Greenhouse Gas Table 4
Notes:
a. Not including 8 percent transmission and distribution losses.
b. Based on 8 percent transmission and distribution losses, or 42,885 GWh x 1.08 = 46,316 GWh.
c. Renewable standards are calculated on retail sales and not on total generation, which accounts for 8 percent transmission and distribution losses.

d. Based on net energy (including 8 percent transmission and distribution losses), not based on retail sales

High GHG-emitting resources, such as coal, are effectively prohibited from entering into new contracts for California electricity deliveries as a result of the Emissions Performance Standard adopted in 2007 pursuant to SB 1368. Between now and 2020, more than 18,000 GWh of energy procured by California utilities under these contracts will have to reduce GHG emissions or be replaced; these contracts are presented in **Greenhouse Gas Table 4**.

Greenhouse Gas Table 4
Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020

Utility	Facility [a]	Contract Expiration	Annual GWh Delivered to CA
PG&E, SCE	Misc In-state Qual.Facilities [a]	2009-2019	4,086
LADWP	Intermountain	2009-2013	3,163 [b]
City of Riverside	Bonanza, Hunter	2010	385
Department of Water Resources	Reid Gardner	2013 [c]	1,211
SDG&E	Boardman	2013	555
SCE	Four Corners	2016	4,920
Turlock Irrigation District	Boardman	2018	370
LADWP	Navajo	2019	3,832
TOTAL			**18,522**

Source: Ex. 200, p. 6.1-68, Greenhouse Gas Table 5
Notes:
a. All facilities are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.
b. Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
c. Contract not subject to Emission Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder[4], all the coal contracts (including those in **Greenhouse Gas Table 4**, which expire by 2020, and other contracts that expire beyond 2020 and are not shown in the table) may be retired at an accelerated rate as coal-fired energy becomes economically uncompetitive. Also shown are the approximate 500 MW

[4] A carbon adder or carbon tax is a specific value added to the cost of a project for per ton of associated carbon or carbon dioxide emissions. Because it is based on, but not limited to, actual operations and emission and can be trued up at year end, it is considered a simple mechanism to assign environmental costs to a project.

of in-state coal and petroleum coke-fired capacity that may be unlikely to contract with California utilities for baseload energy due to SB 1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation; some will come from new and existing natural gas fired generation. All will emit substantially less GHG than the coal and petroleum coke-fired generation, which average about 1.0 $MTCO_2$/MWh without carbon capture and sequestration, resulting in a net reduction in GHG emissions from the California electricity sector.

On May 4, 2010, the State Water Resource Control Board (SWRCB) adopted the "Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling" which will substantially changethe operation of once-through cooled (OTC) power plants in the state (shown in **Greenhouse Gas Table 5).** The policy will likely require retrofit, retirement, or substantial curtailment of dozens of generating units. In 2008, these units collectively produced about 58,000 GWh. While many OTC and recently-built combined cycle plants may well install dry or wet cooling towers, it is unlikely that all the aging plants will do so. Most of these plants already operate at low capacity factors, reflecting their limited ability to compete in the current electricity market. New resources would continue to out-compete aging plants, displacing the energy provided by OTC facilities and accelerating their retirement.

It must be noted, however, that a project like ISEGS located far from coastal load pockets such as the Greater Los Angeles Local Capacity Area, may likely provide energy support to facilitate the retirement of some aging and/or OTC power plants, but would not likely provide any local capacity support at or near the coastal OTC units. We expect that local capacity and voltage support will increasingly be provided by newer, more-efficient natural gas and other forms of generation, including, to the extent practical, distributed generation resources such as rooftop solar. These resources will also help displace older, less-efficient generation and accelerate retirement of those units.

Greenhouse Gas Table 5
Units Utilizing Once-Through Cooling: Capacity and 2008 Energy Output [a]

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2008 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Diablo Canyon 1, 2	Utility	None	No	2,232	17,091	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	15,392	Nuclear
Broadway 3 [b]	Utility	L.A. Basin	Yes	75	90	0.648
El Centro 3, 4 [b]	Utility	None	Yes	132	238	0.814
Grayson 3-5 [b]	Utility	LADWP	Yes	108	150	0.799
Grayson CC [b]	Utility	LADWP	Yes	130	27	0.896
Harbor CC	Utility	LADWP	No	227	203	0.509
Haynes 1, 2, 5, 6	Utility	LADWP	Yes	1,046	1,529	0.578
Haynes CC [c]	Utility	LADWP	No	560	3,423	0.376
Humboldt Bay 1, 2 [a]	Utility	Humboldt	Yes	107	507	0.683
Olive 1, 2 [b]	Utility	LADWP	Yes	110	11	1.008
Scattergood 1-3	Utility	LADWP	Yes	803	1,327	0.618
Utility-Owned				**7,776**	**39,988**	**0.693**
Alamitos 1-6	Merchant	L.A. Basin	Yes	1,970	2,533	0.661
Contra Costa 6, 7	Merchant	S.F. Bay	Yes	680	160	0.615
Coolwater 1-4 [b]	Merchant	None	Yes	727	576	0.633
El Segundo 3, 4	Merchant	L.A. Basin	Yes	670	508	0.576
Encina 1-5	Merchant	San Diego	Yes	951	997	0.674
Etiwanda 3, 4 [b]	Merchant	L.A. Basin	Yes	666	848	0.631
Huntington Beach 1, 2	Merchant	L.A. Basin	Yes	430	916	0.591
Huntington Beach 3, 4	Merchant	L.A. Basin	No	450	620	0.563
Mandalay 1, 2	Merchant	Ventura	Yes	436	597	0.528
Morro Bay 3, 4	Merchant	None	Yes	600	83	0.524
Moss Landing 6, 7	Merchant	None	Yes	1,404	1,375	0.661
Moss Landing 1, 2	Merchant	None	No	1,080	5,791	0.378
Ormond Beach 1, 2	Merchant	Ventura	Yes	1,612	783	0.573
Pittsburg 5-7	Merchant	S.F. Bay	Yes	1,332	180	0.673
Potrero 3	Merchant	S.F. Bay	Yes	207	530	0.587
Redondo Beach 5-8	Merchant	L.A. Basin	Yes	1,343	317	0.810
South Bay 1-4	Merchant	San Diego	Yes	696	1,015	0.611
Merchant-Owned				**15,254**	**17,828**	**0.605**
Total In-State OTC				**23,030**	**57,817**	

Source: Ex. 200, p. 6.1-70, Greenhouse Gas Table 6

a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled), currently under construction, enters commercial operation.

b. Units are aging but are not OTC.

The proposed ISEGS promotes the state's efforts to move towards a high-renewable, low-GHG electricity system, and, therefore, reduce the amount of natural gas used by electricity generation and thus greenhouse gas emissions. Its use of solar energy, resultant limited GHG emissions, and likely replacement of older existing plant capacity, furthers the state's strategy to promote generation system efficiency and reduce fossil fuel use and GHG emissions.

Net GHG emissions for the integrated electric system will decline when new renewable power plants are added to: 1) increases renewable generation towards the 33 percent target; 2) improve the overall efficiency and thus reduce the GHG emission rate of the electric system; or 3) serve load growth or capacity needs more efficiently and produce fewer GHG emissions. We find that ISEGS furthers the state's progress toward achieving these important goals and is consistent with the state policies we discussed in Section 2 of this chapter.

5. Cumulative Impacts On Greenhouse Gases

Cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts." (CEQA Guidelines § 15355.) "A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts." (CEQA Guidelines § 15130[a][1].) Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

GHG assessment is by its very nature a cumulative impact assessment. ISEGS would emit a limited amount of greenhouse gases and, therefore, we have analyzed its potential cumulative impact in the context of its effect on the electricity system, resulting GHG emissions from the system, and existing GHG regulatory requirements and GHG energy policies. The evidence supports our finding that ISEGS would not cause or contribute to a significant adverse cumulative impact on GHG, and would in fact result in a decrease in GHG from the generation of electricity in California.

6. Closure and Decommissioning

Eventually the facility will 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 thus impacts associated with those greenhouse gas emissions would no longer occur. The only other expected GHG emissions would be temporary equipment exhaust (off-road and on-road) from the dismantling activities. These activities would be of much a shorter duration than construction of the project, equipment is assumed to have lower comparative GHG emissions due to technology advancement, and would be required to be controlled in a manner at least equivalent to that required during construction. Therefore, we find that while there will be a temporary CEQA impact on GHG during decommissioning, it will be less than significant.

7. Mitigation Measures/Proposed Conditions of Certification

No Conditions of Certification related to Greenhouse Gas emissions are proposed. The project owner would comply with any future applicable GHG regulations formulated by the ARB, such as GHG reporting or emissions cap and trade markets.

FINDINGS OF FACT

1. The GHG emissions from the ISEGS project construction are likely to be 17,779 $MTCO_2$eduring the 4-year construction period, which is the annual equivalent of 4,445 $MTCO_2$e.

2. There is no numerical threshold of significance under CEQA for construction-related GHG emissions.

3. ISEGS will use best practices to control its construction-related GHG emissions.

4. Construction-related GHG emissions are less than significant if they are controlled with best practices.

5. State government has a responsibility to ensure a reliable electricity supply, consistent with environmental, economic, and health and safety goals.

6. California utilities are obligated to meet whatever electricity demand exists from any and all customers.

7. Under SB 1368 and implementing regulations, California's electric utilities may not enter into long-term commitments with base load power plants

with CO_2 emissions that exceed the Emissions Performance Standard ("EPS") of 0.500 $MTCO_2e$ / MWh.

8. The maximum annual CO_2 emissions from ISEGS operation will be 27,444 $MTCO_2e$, which constitutes an emissions performance factor of 0.029 $MTCO_2e$ / MWh.

9. The SB 1368 EPS is not applicable to ISEGS GHG emissions because the project will be shut down nightly and will operate at or below a 60 percent capacity factor.

10. AB 32 requires CARB to adopt regulations that will reduce statewide GHG emissions, by the year 2020, to the 1990 level. Executive Order S-3-05 requires a further reduction, by the year 2050, to 80 percent below the 1990 level.

11. The California Renewable Portfolio Standard (RPS) requires the state's electric utilities obtain at least 20 percent of the power supplies from renewable sources, by the year 2010.

12. Gubernatorial Executive Orders increase the RPS target requirement to 33 percent by 2020

13. California's power supply loading order requires California utilities to obtain their power first from the implementation of all feasible and cost-effective energy efficiency and demand response, then from renewable energy and distributed generation, and finally from the most efficient available fossil-fired generation and infrastructure improvement.

14. There is no evidence in the record that construction or operation of ISEGS will be inconsistent with the loading order.

15. ISEGS will displace generation from less-efficient (i.e., higher-heat-rate and therefore higher-GHG-emitting) power plants.

16. ISEGS will replace power from coal-fired power plants that will be unable to enter into new contracts or renew contracts with California utilities under the SB 1368 EPS, and from once-through cooling power plants that must reduce their use of coastal or estuarine water.

17. ISEGS operation will reduce overall GHG emissions from the electricity system.

CONCLUSIONS OF LAW

1. ISEGS construction-related GHG emissions will not cause a significant adverse environmental impact.

2. The GHG emissions from a power plant's operation should be assessed in the context of the operation of the entire electricity system of which the plant is an integrated part.

3. ISEGS operational GHG emissions will not cause a significant environmental impact.

4. The SB 1368 EPS does not apply to ISEGS, but if it did, ISEGS GHG emissions will not exceed the EPS limit.

5. ISEGS operation will help California utilities meet their RPS obligations.

6. ISEGS operation will be consistent with California's loading order for power supplies.

7. ISEGS operation will foster the achievement of the GHG goals of AB 32 and Gubernatorial Executive Order S-3-05.

8. The GHG emissions of any power plant must be assessed within the system on a case-by-case basis to ensure that the project will be consistent with the goals and policies enunciated above.

9. Any new power plant that we certify must:

    a) not increase the overall system heat rate;

    b) not interfere with generation from existing renewables or with the integration of new renewable generation; and

    c) have the ability to reduce system-wide GHG emissions.

B. AIR QUALITY

Operation of the Ivanpah Solar Electric Generating System (ISEGS) project will create combustion products and use certain hazardous materials that could expose the general public and workers at the facility to potential health effects.

This section evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the ISEGS project. Criteria air pollutants are defined as air contaminants for which the state and/or federal governments have established an ambient air quality standard to protect public health.

The criteria pollutants analyzed are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), and particulate matter (PM). Two subsets of particulate matter are (1) inhalable particulate matter (less than or equal to 10 microns in diameter, or PM10) and (2) fine particulate matter (less than or equal to 2.5 microns in diameter, or PM2.5). Nitrogen oxides (NOx, consisting primarily of nitric oxide [NO] and NO_2) and volatile organic compounds (VOC) emissions are analyzed because they readily react in the atmosphere as precursors to ozone and, to a lesser extent, particulate matter. Sulfur oxides (SOx) are also analyzed herein because readily react in the atmosphere to form particulate matter and are major contributors to acid rain.

In consultation with the Mojave Desert Air Quality Management District, Staff and the Bureau of Land Management (BLM) have evaluated whether the project will likely conform with applicable LORS, whether it will likely result in significant air quality impacts, including violations of ambient air quality standards, and whether the project's proposed mitigation measures will likely reduce potential impacts to insignificant levels.

As discussed below, the evidence establishes that ISEGS will meet the provisions of all applicable air quality laws, and with implementation of the mitigation measures set forth in the Conditions of Certification, will not cause any new violations of state or federal standards even when modeled with worst case ambient concentrations. Thus, there are no direct adverse air quality impacts attributable to the project.

The record includes the assumptions, methodologies, and results of the air quality analyses performed by the Applicant and Staff.

SUMMARY AND DISCUSSION OF THE EVIDENCE

The federal Clean Air Act and the California Clean Air Act both require the establishment of standards for ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by the California Air Resources Board (CARB), are typically more protective than the federal AAQS, which are established by the U.S. Environmental Protection Agency (EPA). The standards consist of two parts: an allowable concentration of a pollutant and an averaging time over which the concentration is to be measured. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour, for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 month). The state and federal AAQS are listed in **AIR QUALITY Table 1** below.

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Air Quality Table 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	—	0.18 ppm (339 µg/m^3)
Sulfur Dioxide (SO_2)	Annual	0.030 ppm (80 µg/m^3)	—
	24 Hour	0.14 ppm (365 µg/m^3)	0.04 ppm (105 µg/m^3)
	3 Hour	0.5 ppm (1300 µg/m^3)	—
	1 Hour	—	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
	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%.

Source: ARB 2009a.

As shown by the table, the averaging times for the various air quality standards and the times over which they are measured, range from one-hour to annual averages. 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 µg/m^3, respectively.)

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 "nonattainment" if concentration of a particular contaminant standard is violated. Where there is insufficient data to support designation as either attainment or nonattainment, the area can be designated as unclassified. An area could be attainment for one air contaminant while nonattainment for another, or attainment under the federal standard and nonattainment under the state standard for the same air contaminant. (Ex. 300, pp. 6.1-4 through 6.1-5.)

1. Existing Air Quality

ISEGS is located in the Mojave Desert Air Basin (MDAB) and is under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD). As shown in **Air Quality Table 2** below**,** this area is designated as moderate nonattainment for the state ozone standard, attainment for federal ozone standard, nonattainment for both the state and the federal PM10 standards, and attainment for the state and federal CO, NO_2, SO_2, and PM2.5 standards. (Ex. 300, pp. 6.1-5 through 6.1-6, 6.1-8 through 6.1-11.)

Air Quality Table 2
Federal and State Attainment Status
Mojave Desert Air Basin [a]

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

Source: ARB 2009b, U.S. EPA 2009a.

a Attainment status for the site area only, not the entire MDAB.
b Attainment = Attainment or Unclassified.

2. Construction Impacts and Mitigation

The ISEGS project consists of three phases with a 12 month overlap between each phase. (Ex. 300, p. 6.1-13.) Construction generally consists of site preparation and construction and installation of major equipment and structures. Thus, there are two types of construction emissions: fugitive dust and

combustion emissions. Fugitive dust comes from moving, disturbing, and traveling over the work site and roads. Combustion emissions come from construction equipment exhausts, such as vehicles and heavy equipment/internal combustion engines. In addition, a small amount of hydrocarbon emissions may occur because of the temporary storage of petroleum fuel at the site. (Exs. 1, p. 5.1-33, 300, p. 6.1-20.)

Air Quality Table 3 presents the Applicant's estimate of direct onsite and offsite (delivery and employee vehicle) construction emissions for NOx, VOC, SOx, CO, PM10 and PM2.5

Air Quality Table 3
ISEGS Construction Emissions

Solar Facility Construction	Daily Emissions (lbs/day) [a]					
	NOx	SOx	CO	VOC	PM10	PM2.5
Maximum Daily Onsite Emissions	363	1	117	23	199	46
Maximum Daily Offsite Emissions	137	1	392	40	86	16
Maximum Daily Emissions	500	2	509	63	285	63
	Annual Emissions (tons/year) [a]					
Maximum Annual Onsite Emissions	29.9	0.1	9.9	2.0	18.5	4.3
Maximum Annual Offsite Emissions	11.4	0.1	34.3	3.5	6.0	1.5
Maximum Annual Emissions	41.3	0.2	44.2	5.4	24.5	5.8

Source: AFC (BSE2007a), and Data Responses (CH2ML 2008h).

Notes:

a. Emissions include fugitive dust.

The emissions estimates in Air Quality Table 3 incorporate the fugitive dust control measures contained in Condition **AQ-SC3**. Staff evaluated these emission estimates and deemed them reasonable, with the caveat that that the fugitive dust emissions estimate may be underestimated. Notably, Staff determined that aggressive mitigation is necessary to ensure that the PM10 annual emission during construction would not be greater than 100 tons per year and exceed General Conformity applicability thresholds thereby triggering a formal conformity determination under the federal Clean Air Act General Conformity Rule. (Ex. 300, pp. 6.1-13, 6.1-22.) As a result, we have adopted Conditions of Certification **AQ-SC1** through **AQ-SC 5** to mitigate the potentially significant impacts.

The Applicant also performed a modeling analysis using estimated peak hourly, daily, and annual construction equipment exhaust and fugitive dust emissions. **Air Quality Table 4** presents the results.

Air Quality Table 4
Maximum Project Construction Impacts

Pollutants	Avg. Period	Impacts ($\mu g/m^3$)	Background [a] ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr	200.4	73.3	273.7	339	81%
	Annual	0.2	7.3	7.5	57	13%
PM10	24-hr	6.7	96	102.7	50	205%
	Annual	0.2	12.7	12.9	20	65%
PM2.5	24-hr	1.6	12.9	14.5	35	41%
	Annual	0.0	4.5	4.5	12	38%
CO	1-hr	109	4,025	4,134	23,000	18%
	8-hr	24	1,367	1,391	10,000	14%
SO_2	1-hr	0.9	94.3	95.2	665	14%
	24-hr	0.0	13.1	13.1	105	12%
	Annual	0.0	2.7	2.7	80	3%

Source: CH2ML 2008h.

Note:

a - Background values have been adjusted per staff recommended background concentrations shown in Staff's FSA **Air Quality Table 5**.

As shown, with the exception of 24-hour PM10 impacts, the project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. However, in light of the project area's existing PM10 and ozone nonattainment status, construction NO_X, VOC, and PM emissions are potentially significant and require mitigation. The modeling analyses show that with implementation of Conditions of Certification **AQ-SC1** through **AQ-SC5**, these potential impacts will be mitigated and project construction is not predicted to cause significant impacts under the California Environmental Quality Act (CEQA) or the National Environmental Policy Act (NEPA). (Ex. 300, pp. 6.1-20 through 6.1-21.)

3. Operation Impacts and Mitigation

As previously discussed in this Decision, the ISEGS facility would be a nominal 370 Megawatt (MW) heliostat mirror and power tower thermal solar electrical

generating facility comprised of three plants, ISEGS 1 (120 MW), ISEGS 2 (125 MW) and ISEGS 3 (125 MW). The direct air pollutant emissions from solar power generation are minimal; however, the facility will start-up each day with the assist of one large boiler associated with each plant and there are other auxiliary equipment and maintenance activities necessary to operate and maintain the facility.

The ISEGS onsite stationary and mobile emission sources are as follows:

- Three natural gas fueled, 231.1 MMBtu/hr boilers used for daily startup, each limited to no more than 4 hours of use per day and no more than 1,460 hours of use per year.
- Three 240-bhp diesel-fired emergency fire water pump engines, one for each plant, that will operate in non-emergency mode no more than 50 hours per year or no more than required by National Fire Protection Association, whichever is greater.
- Three 3,750-bhp diesel-fired emergency generator engines that will operate in non-emergency mode no more than 50 hours per year.
- Onsite diesel and gasoline fueled maintenance vehicles used for mirror washing and other maintenance/operation support activities. (Ex. 300, p. 6.1-14.)

The ISEGS maximum onsite stationary source, onsite mobile equipment, and offsite vehicle emissions, including fugitive PM10 emissions, are estimated and summarized below in **Air Quality Table 5**.

Air Quality Table 5
ISEGS Operation - Maximum Hourly, Maximum Daily, and Annual Emissions

	Maximum Hourly Emissions (lbs/hr)					
Emission Source	NOx	SOx	CO	VOC	PM10	PM2.5
Boilers	10.00	2.50	16.90	4.90	6.80	6.80
Emergency Generator Engines	19.43	0.02	10.75	0.41	0.62	0.57
Emergency Fire Pump Engines	0.00	0.00	0.00	0.00	0.00	0.00
Maintenance Vehicles (all types)	2.32	0.02	1.48	0.18	14.60	3.13
Employee and Delivery Vehicles (offsite)	3.62	0.03	19.15	1.88	1.40	0.37
Total Maximum Hourly Emissions	35.38	2.57	48.28	7.38	23.41	10.87
Emission Source	Maximum Daily Emissions (lbs/day)					
Boilers	40.0	10.0	67.6	19.6	27.2	27.2
Emergency Generator Engines	77.7	0.1	43.0	1.7	2.5	2.3
Emergency Fire Pump Engines	4.6	0.0	4.1	0.2	0.2	0.2
Maintenance Vehicles (all types)	18.6	0.2	11.9	1.4	116.8	25.0
Employee and Delivery Vehicles (offsite)	20.5	0.2	101.9	10.0	7.4	2.0
Total Maximum Daily Emissions	161.4	10.4	228.4	32.9	154.1	56.7
Emission Source	Annual Emissions (tons/year) [a]					
Boilers	7.3	1.8	12.3	3.6	5.0	5.0
Emergency Generator Engines	3.9	0.0	2.1	0.1	0.1	0.1
Emergency Fire Pump Engines	0.1	0.0	0.1	0.0	0.0	0.0
Maintenance Vehicles (all types)	2.3	0.0	1.5	0.2	14.6	3.1
Employee and Delivery Vehicles (offsite)	1.8	0.0	17.1	1.7	1.2	0.3
Total Annual Emissions	15.4	1.9	33.1	5.5	20.9	8.5

Source: BSE 2007a, CH2ML 2008a, Tier II and Tier III maximum emissions for the engines and staff estimates of paved road dust emissions for the employee and delivery vehicles.

Note:

a – The annual emissions are based on permit limits, but the actual annual boiler use and annual emissions are expected to be less than a third of the permit limits.

The emissions estimates in **Air Quality Table 5** incorporate the fugitive dust control measures contained in Condition **AQ-SC7**. Staff evaluated these emission estimates and determined that that the fugitive dust emissions estimate may be underestimated. As with the construction-related emission, Staff' determined that aggressive mitigation is necessary to ensure that the PM10 annual emission during operation would not be greater than 100 tons per year and would not exceed General Conformity applicability thresholds thereby triggering a formal conformity determination under the federal Clean Air Act

General Conformity Rule. Staff also determined that there is also potential for localized exceedances of the federal PM10 AAQS. As a result, we have adopted Conditions of Certification **AQ-SC6** through **AQ-SC10** to mitigate the potentially significant impacts. (Ex. 300, pp. 6.1-14 through 6.1-15, 6.1-22 through 6.1-24, 6.1-38.)

The record also shows that the direct stationary source emissions from ISEGS are well below the Prevention of Significant Deterioration (PSD) and/or nonattainment New Source Review (NSR) permitting applicability thresholds. Consequently, ISEGS is a minor stationary source not likely to create significant NEPA impacts. (Ex. 300, pp. 6.1-15 through 6.1-16.)

The Applicant also provided a modeling analysis to estimate the impacts of the project's NOx, PM10, CO, and SOx emissions[1] resulting from project operation. **Air Quality Table 6** presents the results of the Applicant's modeling analysis, which indicates that with the exception of 24-hour PM10 impacts, the project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants.

[1] The Applicant's modeling analysis uses assumptions that are somewhat different than those presented by **Air Quality Table 7** in Staff's Final Staff Assessment. These differences in the analyses do not change Staff's overall modeling analysis impact findings. (Ex. 300, p. 6.1-23.)

Air Quality Table 6
Project Operation Emissions Impacts

Pollutants	Avg. Period	Impacts ($\mu g/m^3$)	Background [a] ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr	150.4	73.3	223.4	339	66%
	Annual	0.1	7.3	7.4	57	13%
PM10	24-hr	3.3	96	99.3	50	199%
	Annual	0.5	12.7	13.2	20	66%
PM2.5 [c]	24-hr [b]	0.2	12.9	13.1	35	37%
	Annual	0.0	4.5	4.5	12	38%
CO	1-hr	321	4,025	4,346	23,000	19%
	8-hr	55	1,367	1,422	10,000	14%
SO_2	1-hr	3.9	94.3	98.2	665	15%
	24-hr [b]	0.1	13.1	13.2	105	13%
	Annual	0.0	2.7	2.7	80	3%

Source: CH2ML 2008h.

Notes:
[a] Background values have been adjusted per staff recommended background concentrations shown in **Air Quality Table 5**.
[b] Maximum 24-hour hour PM2.5 and SO_2 concentrations occur under fumigation conditions.
[c] PM2.5 impacts were not remodeled to include maintenance emissions like the other pollutants, the results presented are stationary source emission only from the original AFC modeling analysis. With the maintenance PM2.5 emission the PM2.5 results would be higher than shown but lower than the PM10 results as the PM2.5 emissions are less than the PM10 emissions. Therefore, the PM2.5 impacts with maintenance emissions would not create new exceedances of the ambient air quality standards.

Staff evaluated the Applicant's results and again, as with Staff's evaluation of construction emission impacts, determined that the operating NOx, VOC, and PM emissions are potentially CEQA significant and require mitigation. The modeling analysis shows that with implementation of the recommended fugitive dust mitigation measures contained in Conditions of Certification **AQ-SC6** and **AQ-SC7**, ISEGS operation is not predicted to cause significant violations of the federal AAQS or cause significant NEPA impacts. (Ex. 300, p. 6.1-23 through 6.1-24.)

Additionally, implementation of Conditions of Certification **AQ-SC8** through **AQ-SC10** will further ensure that potential impacts are insignificant. Condition **AQ-SC8** will ensure that the license is amended as necessary to incorporate changes to the air quality permits. Condition **AQ-SC9** requires engines to meet model year EPA/ARB Tier emission standards for the year purchased. Condition AQ-**SC10** will ensure that the boiler operation does not exceed the amount that was modeled in the Applicant's air quality modeling analysis and to formalize the

Applicant's assertion in the Application for Certification that "[h]eat input from natural gas will not exceed 5 percent of the heat input from the sun, on an annual basis." (Exs. 1, p. 5.1-1, 300, pp. 6.1-28, 6.1-39.)

4. Construction and Operation Overlap Impacts and Mitigation

For a period of time, the construction and operation of the facilities will overlap. The Applicant estimated the maximum overlapping emissions under two scenarios: when ISEGS 1 is operating and ISEGS 2 is under construction and when ISEGS 1 and 2 are operating and ISEGS 3 is under construction.

The record includes the results of the analysis of the worst-case overlapping construction and operation emissions, which occur when operating ISEGS 1 and 2 and constructing ISEGS 3. (Ex. 300, pp. 6.1-24 through 6.1-6.1-25.) The record also includes results of the Applicant's modeling analysis estimating the impacts of the project's NOx, PM10, CO, and SOx emissions resulting from worst-case construction/operation overlap.

The construction and operations analyses predict that with the exception of 24-hour PM10 impacts, the project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. Again, considering the existing PM10 and ozone non-attainment status for the project site area, the NOx, VOC, and PM emissions during the overlapping construction and operation periods are potentially CEQA significant and require mitigation.

The modeling analysis shows that with implementation of the recommended fugitive dust mitigation measures contained in Conditions of Certification **AQ-SC3** and **AQ-SC7**, the project's worst-case construction/operation overlap period is not predicted to cause violations of the federal AAQS or cause significant NEPA impacts. (Ex. 300, pp. 6.1-24 through 6.1-25.)

5. Compliance with Mojave Desert Air Quality Management District Rules and Regulations

The record establishes that the project will comply with applicable District rules and regulations, including NSR requirements. (Exs. 300, p. 6.1-3, 307.) We have included the District's Final Determination of Compliance conditions in this Decision as Conditions of Certification **AQ-1** through **AQ-31**.

6. Cumulative Impacts

Cumulative impacts result from the proposed project's incremental effect, together with other closely related past, present and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub. Res. Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15130, 15355.)

The air quality analysis discussed herein is concerned with criteria air pollutants, which have impacts that are usually (though not always) cumulative by nature. Although a project by itself would rarely cause a violation of a federal or state criteria pollutant standard, a new source of pollution may contribute to violations of criteria pollutant standards because of the existing background sources or foreseeable future projects.

As a result, the record contains significant analysis of cumulative impacts regarding project construction and operation. For instance, the evidence includes a description of the air quality background in northeastern San Bernardino County portion of the Mojave Desert Air Basin and discusses historical ambient levels for each of the assessed criteria pollutants. The evidence considers the project's contribution to the local existing background caused by project construction.

The record also contains a summary of projections for criteria pollutants by the Mojave Desert Air Quality Management District and the District's programmatic efforts to abate such pollution, an analysis of the project's localized cumulative impacts, and the project's direct operating emissions combined with other local major emission sources.

Furthermore, the Applicant, in consultation with the District, has conducted a survey of new development and stationary sources that are either under construction, or have received permits to be built or operate in the near future and that have the potential for emissions of criteria air contaminants within six miles of the project site. The survey results indicate that no such sources exist within the 6-miles radius of the proposed project site.

There are, however, several proposed projects near the project site including several other renewable energy facilities (solar and wind), an airport, a high speed train, a new commercial/residential development in Jean, and other long-term projects with minimal air quality impacts, and temporary projects with no

long term air quality impacts. Staff determined that in general, most of these projects would create minimal long-term emissions, but construction emissions of the other renewable energy facilities, the airport, and the large development in Jean will likely have high temporary emissions from construction vehicles and fugitive dust. Staff further determined that in the long-term, several of the developments should cause beneficial impacts such as the high-speed train reducing traffic emissions on I-15, and the renewable energy projects reducing emissions within the area of the Western Electricity Coordinating Council.

Based on the evidence, it appears that CEQA significant cumulative air quality impacts are not expected after implementation of the Conditions of Certification. With the implementation of best practices in the construction and operation of ISEGS and other renewable power plants in the southwest desert, any potential cumulative effects will be reduced, including effects from criteria pollutants and their contributions to region ozone and particulate matter and haze. (Ex. 300, pp. 6.1-30 through 6.1-33.)

7. Public and Agency Comments

No public or agency comments were received. However, Intervenor Basin Range and Watch asked about the source and quantity of water for dust control during operation and construction and recommended that this information should be provided. Staff responded that the source of water for dust control during plant construction and operation is assumed to be the same on-site ground water wells used for other plant water needs. Staff further explained that the even though the Applicant estimated 128 acre-feet of use during the 15 months of initial grading for the three project phases based on a 5 day per week construction schedule and 5 months of initial grading per construction phase, the Applicant did not provide estimates of water use for dust control during the rest of the construction period or for ongoing operations. Staff advised Basin and Range Watch that Staff modified recommended Conditions of Certification **AQ-SC3** and **AQ-SC7** to both increase dust control efficiency and minimize water use through the required use of polymeric dust suppressants on the site's unpaved roads and other disturbed surfaces to create and maintain stabilized surfaces during project construction and operation. We have adopted those conditions are recommended. (Ex. 300, pp. 6.1-37 – 6.1-38.)

FINDINGS AND CONCLUSIONS

Based on the record, we find as follows:

1. The ISEGS project is located in the Mojave Desert Air Basin and is under the jurisdiction of the Mojave Desert Air Quality Management District.

2. The ISEGS project area is designated as moderate nonattainment for the state ozone standard, attainment for federal ozone standards, nonattainment for both the state and federal PM10 standards, and attainment of unclassified for the state and federal CO_2, NO_2, SO_2, and PM2.5 standards.

3. The project will not cause new violations of any NO_2, SO_2, PM2.5, or CO ambient air quality standards. Therefore, the NO_x, SO_x, PM2.5, and CO emission impacts are not significant.

4. The project's NO_x and VOC emissions can contribute to the existing violations of the ozone standards. However, the required mitigation will reduce the project's impacts to a level that is less than significant.

5. The project's PM10 emissions can contribute to the existing violations of the state 24-hour PM10 air quality standard during construction and operation. However, the required mitigation will reduce the project's impacts to a level that is less than significant.

6. The Mojave Desert Air Quality Management District issued a Final Determination of Compliance (FDOC) finding that ISEGS will comply with all applicable District rules and regulations for project operation. The District's FDOC conditions are included herein as Conditions of Certification **AQ-1** through **AQ-31**.

7. The record contains an adequate analysis of the project's contributions to cumulative air quality impacts.

8. Implementation of the Conditions of Certification listed below ensures that the ISEGS will not result in any significant direct, indirect, or cumulative adverse impacts to air quality.

CONCLUSION OF LAW

1. The Commission therefore concludes that the mitigation measures imposed are sufficient to ensure that ISEGS will conform with all applicable laws, ordinances, regulations, and standards relating to air quality as set forth in the pertinent portion of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4** and **AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the BLM's Authorized Officer and CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4,** and **AQ-SC5**.

Verification: At least 60 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the BLM's Authorized Officer and CPM for approval. The AQCMP shall include effectiveness and environmental data for the proposed soil stabilizer. The BLM's Authorized Officer or CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the BLM's Authorized Officer and CPM in each Monthly Compliance Report that demonstrates compliance with the Air Quality Construction Mitigation Plan (AQCMP) mitigation measures for the purposes of preventing all fugitive dust plumes from leaving the project. Any deviation from the AQCMP mitigation measures shall

require prior BLM Authorized Officer and CPM notification and approval.

Verification: The AQCMM shall provide the BLM's Authorized Officer and the CPM a Monthly Compliance Report (**COMPLIANCE-6**) to include the following to demonstrate control of fugitive dust emissions:

A. a summary of all actions taken to maintain compliance with this condition;

B. copies of any complaints filed with the District in relation to project construction; and

C. any other documentation deemed necessary by the BLM Authorized Officer, CPM, and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

The following fugitive dust mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**.

a) The main access roads through the facility to the power block areas will be either paved or stabilized using soil binders, or equivalent methods, to provide a stabilized surface that is similar for the purposes of dust control to paving, that may or may not include a crushed rock (gravel or similar material with fines removed) top layer, prior to initiating construction in the main power block area, and delivery areas for operations materials (chemicals, replacement parts, etc.) will be paved prior to taking initial deliveries.

b) All unpaved construction roads and unpaved operational site roads, as they are being constructed, shall be stabilized with a non-toxic soil stabilizer or soil weighting agent that can be determined to be both as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation. All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading; and after active construction activities shall be stabilized with a non-toxic soil stabilizer or soil weighting agent, or alternative approved soil stabilizing methods, in order to comply with the dust mitigation objectives of Condition of Certification **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.

c) No vehicle shall exceed 10 miles per hour on unpaved areas within the construction site, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

d) Visible speed limit signs shall be posted at the construction site entrances.

e) All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.

f) Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

g) All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

h) All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM and BLM Authorized Officer.

i) Construction areas adjacent to any paved roadway below the grade of the surrounding construction area or otherwise directly impacted by sediment from site drainage shall be provided with sandbags or other equivalently effective measures to prevent run-off to roadways, or other similar run-off control measures as specified in the Storm Water Pollution Prevention Plan (SWPPP), only when such SWPPP measures are necessary so that this condition does not conflict with the requirements of the SWPPP.

j) All paved roads within the construction site shall be swept daily or as needed (less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

k) At least the first 500 feet of any paved public roadway exiting the construction site or exiting other unpaved roads en route from the construction site or construction staging areas shall be swept as needed (less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff resulting from the construction site activities is visible on the public paved roadways.

l) All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.

m) All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.

n) Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (A) off the project site and within 400 feet upwind of any regularly occupied structures not owned by the project owner or (B) 200 feet beyond the centerline of the construction of linear facilities

indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if Step 1, specified above, fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the CPM or BLM Authorized Officer any directive from the AQCMM or Delegate to shut down an activity, if the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM or BLM Authorized Officer before that time.

Verification: The AQCMM shall provide the BLM's Authorized Officer and the CPM a Monthly Compliance Report (**COMPLIANCE-6**) to include:

A. a summary of all actions taken to maintain compliance with this condition;

B. copies of any complaints filed with the District in relation to project construction; and

C. any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the MCR, a construction mitigation report that demonstrates compliance with the following mitigation measures for purposes of controlling diesel construction-related emissions. Any deviation from the following mitigation measures shall require prior and CPM notification and approval.

a. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.

b. All construction diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. This good faith effort shall be documented with signed written correspondence by the appropriate construction contractors along with documented correspondence with at least two construction equipment rental firms. In the event that a Tier 3 engine is not available for any off-road equipment larger than 100 hp, that equipment shall be equipped with a Tier 2 engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is “not practical” for the following, as well as other, reasons.

    1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and the highest level of available control using retrofit or Tier 1 engines is being used for the engine in question; or

    2. The construction equipment is intended to be on site for 5 days or less.

    3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not possible.

c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item “b” occurs within 10 days of termination of the use, if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists :

1. The use of the retrofit control device is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.

2. The retrofit control device is causing or is reasonably expected to cause engine damage.

3. The retrofit control device is causing or is reasonably expected to cause a substantial risk to workers or the public.

4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

d. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

e. All diesel heavy construction equipment shall not idle for more than five minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.

f. Construction equipment will employ electric motors when feasible.

Verification: The AQCMM shall include in the Monthly Compliance Report (**COMPLIANCE-6**):

A. A summary of all actions taken to maintain compliance with this condition;

B. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained; and

C. Any other documentation deemed necessary by the CPM, and the AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC6 The project owner, when obtaining dedicated on-road or off-road vehicles for mirror washing activities and other facility maintenance activities, shall only obtain new model year vehicles that meet California on-road vehicle emission standards or appropriate U.S.EPA/California off-road engine emission standards for the model year when obtained.

Other vehicle/fuel types may be allowed assuming that the emission profile for those vehicles, including fugitive dust generation emissions, is comparable to the vehicles types identified in this condition.

Verification: At least 60 days prior to the start of commercial production, the project owner shall submit to the CPM a copy of the plan that identifies the size and type of the on-site vehicle and equipment fleet and the vehicle and equipment purchase orders and contracts and/or purchase schedule. The plan shall be updated every other year and submitted in the Annual Compliance Report (**COMPLIANCE-7**).

AQ-SC7 The project owner shall provide a site Operations Dust Control Plan, including all applicable fugitive dust control measures identified in the verification of **AQ-SC3** that would be applicable to reducing fugitive dust from ongoing operations~~;~~ that:

A. describes the active operations and wind erosion control techniques such as windbreaks and chemical dust suppressants, including their ongoing maintenance procedures, that shall be used on areas that could be disturbed by vehicles or wind anywhere within the project boundaries; and

B. identifies the location of signs throughout the facility that will limit traveling on unpaved portion of roadways to solar equipment maintenance vehicles only. In addition, vehicle speed shall be limited to no more than 10 miles per hour on these unpaved roadways, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

The site operations fugitive dust control plan shall include the use of durable non-toxic soil stabilizers on all regularly used unpaved roads and disturbed off-road areas, or alternative methods for stabilizing disturbed off-road areas, within the project boundaries, and shall include the inspection and maintenance procedures that will be undertaken to ensure that the unpaved roads remain stabilized. The soil stabilizer used shall be a non-toxic soil stabilizer or soil weighting agent that can be determined to be both as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation.

The performance and application of the fugitive dust controls shall also be measured against and meet the performance requirements of condition **AQ-SC4**. The performance requirements of **AQ-SC4** shall also be included in the Operations Dust Control Plan.

Verification: At least 60 days prior to start of commercial operation, the project owner shall submit to the BLM's Authorized Officer and the CPM for review and approval a copy of the site Operations Dust Control Plan that identifies the dust and erosion control procedures, including effectiveness and environmental data for the proposed soil stabilizer, that will be used during operation of the project and that identifies all locations of the speed limit signs.

At least 60 days after commercial operation, the project owner shall provide to the BLM's Authorized Officer and the CPM a report identifying the locations of all speed limit signs, and a copy of the project employee and contractor training manual that clearly identifies that project employees and contractors are required to comply with the dust and erosion control procedures and on-site speed limits.

AQ-SC8 The project owner shall provide the CPM copies of all District issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) for the facility.

Verification: The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. Environmental Protection Agency (U.S. EPA), and any revised permit issued by the District or U.S. EPA, for the project. The project owner shall submit any ATC, PTO, and proposed air permit modification to the CPM within 5 working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

AQ-SC9 The emergency generator and fire pump engines procured for this project will meet or exceed the NSPS Subpart IIII emission standards for the model year that corresponds to their date of purchase.

Verification: The project owner shall submit the emergency engine specifications to the CPM prior to engine installation.

AQ-SC10 The ISEGS 1, ISEGS 2, and ISEGS 3 boilers shall not exceed a total annual natural gas fuel heat input that is more than 5 percent of the total annual heat input from the sun for ISEGS1, ISEGS2, and ISEGS 3, respectively.

Verification: Annual natural gas fuel heat input data and annual solar heat input data for the ISEGS 1, ISEGS 2, and ISEGS 3 units showing compliance with this condition shall be provided in the Annual Compliance Report (**COMPLIANCE-7**). The Annual Compliance Report shall include information separately for ISEGS 1, ISEGS 2, and ISEGS 3. The initial Annual Compliance Report shall include documentation of the methodology used to verify compliance with this Condition. The documentation shall include a heat balance diagram, engineering analysis, assumptions and supporting data.

DISTRICT CONDITIONS OF CERTIFICATION

District conditions **AQ-1** through **AQ-31** are CEQA-only required conditions. The District revised the permit conditions to reflect the revised project scope presented in the Mitigated Ivanpah 3 proposal and issued Revision C to the District's Final Determination of Compliance (FDOC) for the project on April 15, 2010. Staff revised the District conditions to incorporate the Revision C changes.

CONDITIONS APPLICABLE TO IVANPAH 1, 2 & 3 (THREE 3) BOILERS, MDAQMD APPLICATION NUMBERS/PERMIT NUMBERS; 00009311 (B010375) 00009314 (B010376) & 00009320 (B010377)

Equipment Description:

Nebraska boilers, Model NSX-G-120, each equipped with Natcom Low-NOx Burners rated at a maximum heat input of 231.1 MMBTU/hr, and flue gas recirculation (FGR or EGR) operating at 13.9 percent excess air, fueled exclusively on utility grade natural gas. Equipment shall use no more than 225,000 cu-ft/hr of fuel and provide 220,000 lb/hr of steam. Each boiler is equipped with a stack that is 130 feet high and 40 inches in diameter.

These conditions (**AQ-1** through **AQ-12**) apply separately to each boiler unless otherwise specified.

AQ-1 Operation of this equipment must be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below.

Verification: Any non-compliant operations shall be listed in the Annual Compliance Report (**COMPLIANCE-7**).

AQ-2 The owner/operator shall operate this equipment in strict accord with the recommendations of the manufacturer or supplier and/or sound engineering principles and consistent with all information submitted with the application for this permit, which produce the minimum emission of air contaminants.

Verification: As part of the Annual Compliance Report (**COMPLIANCE-7**), the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQ-3 This boiler shall use only natural gas as fuel and shall be equipped with a meter measuring fuel consumption in standard cubic feet.

Verification: As part of the Annual Compliance Report (**COMPLIANCE-7**), the project owner shall include proofs that only pipeline quality, or Public Utility Commission regulated natural gas are used for the boilers.

AQ-4 The owner/operator shall maintain a current, on-site (at a central location if necessary) log for this equipment for five (5) years, which shall be provided to District, state or federal personnel upon request. This log shall include calendar year fuel use for this equipment in standard cubic feet, or BTU's, and daily hours of operation.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or Energy Commission staff.

AQ-5 Not later than 180 days after initial startup, the operator shall perform an initial compliance test on this boiler in accordance with the District Compliance Test Procedural Manual. This test shall demonstrate that this equipment does not exceed the following emission maximums:

Pollutant	ppmvd	Lb/MMBtu	Lb/hr	
*NOx	9.0	0.011	2.5	(per USEPA Methods 19 and 20)
SOx	1.7	0.003	0.6	
*CO	25.0	0.018	4.2	(per USEPA Methods 10)
VOC	12.6	0.0054	1.2	(per USEPA Methods 25A and 18)
PM10	n/a	0.007	1.7	(per USEPA Methods 5 and 202 or CARB Method 5)

*corrected to 3% oxygen, on a dry basis, averaged over one hour
Opacity shall be conducted per Method 9; Flue gas flow rate shall be quantified in dscf per USEPA Methods 1 through 5.

Verification: The project owner shall notify the District and the CPM within fifteen (15) working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

AQ-6 The owner/operator shall perform annual compliance tests in accordance with the District Compliance Test Procedural Manual. Prior to performing these annual tests, the boiler shall be tuned in accord with the manufacturer's specified tune-up procedure, by a qualified technician. Subsequent tests shall demonstrate that this equipment does not exceed the following emission maximums:

Pollutant	ppmvd	Lb/MMBtu	Lb/hr	
*NOx	9.0	0.011	2.5	(per USEPA Methods 19 and 20)
SOx	1.7	0.003	0.6	
*CO	25.0	0.018	4.2	(per USEPA Methods 10)
VOC	12.6	0.0054	1.2	(per USEPA Methods 25A and 18)
PM10	n/a	0.007	1.7	(per USEPA Methods 5 and 202 or CARB Method 5)

*corrected to 3% oxygen, on a dry basis, averaged over one hour
Opacity shall be conducted per Method 9; Flue gas flow rate shall be quantified in dscf per USEPA Methods 1 through 5.

Verification: The project owner shall notify the District and the CPM within fifteen (15) working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

AQ-7 This boiler shall be operated in compliance with all applicable requirements of 40 CFR 60 Subpart Db - Standards of Performance for Industrial Commercial-Institutional Steam Generating Units (NSPS Db).

Verification: The project owner shall complete and submit to the CPM a compliance plan that provides a list of the 40 CFR 60 Subpart Db plans, tests, and recordkeeping requirements and their compliance schedule dates as applicable for the ISEGS Boilers 1, 2 and 3 at least 30 days prior to first fire of the boilers or earlier as necessary for compliance with Subpart Db.

AQ-8 Records of fuel supplier certifications of fuel sulfur content shall be maintained to demonstrate compliance with the sulfur dioxide and particulate matter emission limits.

Verification: Complying with Condition of Certification **AQ-3** shall be used to demonstrate compliance with this condition.

AQ-9 The owner/operator shall continuously monitor and record fuel flow rate and flue gas oxygen level.

Verification: At least 120 days prior to construction of the boiler stacks, the project owner shall provide the District for approval, and the CPM for review, a detailed drawing and a plan on how the measurements and recordings, required by this condition, will be performed by the chosen monitoring system.

AQ-10 In lieu of installing CEMs to monitor NOx emissions, and pursuant to 40 CFR 60 Subpart Db, Section 60.49b(c), the owner/operator shall monitor boiler operating conditions and estimate NOx emission rates per a District approved emissions estimation plan. The plan shall be based on the initial source tests as required by condition AQ-5, and annually pursuant to condition AQ-6. The plan shall include test results, operating parameters, analysis, conclusions and proposed NOx estimating relationship consistent with established emission chemistry and operational effects.

Verification: This initial plan shall be submitted to the District for approval, and the CPM for review, within 360 days of the initial startup. Any proposed changes to a District-approved plan shall include subsequent test results, operating parameters, analysis, and any other pertinent information to support the proposed changes. The District must approve any emissions estimation plan or revision for estimated NOx emissions to be considered valid.

AQ-11 The owner/operator shall comply with all applicable recordkeeping and reporting requirements of NSPS Db.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-12 This boiler shall not burn more than 0.9 MMSCF of natural gas in any single day, and no more than 328 MMSCF in any calendar year.

a. These limits shall not apply during the facility commissioning period. The commissioning period shall begin the first time fuel is fired in the boiler. The commissioning period shall end when the facility achieves commercial operation, but no later than 180 days after first fire.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

CONDITIONS APPLICABLE TO IVANPAH I, II, AND III EMERGENCY FIRE PUMPS, MDAQMD APPLICATION NUMBERS/PERMIT NUMBERS; 00009312 (E010380), 00009315 (E010378), AND 00009319 (E010384)

Equipment Description:

Year of Manufacture 2010, Tier III, One Clarke, Diesel fired internal combustion engine, Model No. JU6H-UF62, and Serial number tbd, After Cooled, Direct Injected, Turbo Charged, producing 240 bhp with 6 cylinders at 2,600 rpm (or equiv.) while consuming a maximum of 10 gal/hr. This equipment powers a pump.

These conditions (**AQ-13** through **AQ-22**) apply separately to all three emergency fire pump engines unless otherwise specified.

AQ-13 This system shall be installed, operated and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA or CEC staff.

AQ-14 These engines may operate in response to notification of impending rotating outage if the area utility has ordered rotating outages in the area where the engines are located or expects to order such outages at a particular time, the engines are located in the area subject to the rotating outage, the engines are operated no more than 30 minutes prior to the forecasted outage, and the engines are shut down immediately after the utility advises that the outage is no longer imminent or in effect.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-15 These engines may operate in response to fire suppression requirements and needs.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-16 These units shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15ppm) on a weight per weight basis per CARB Diesel or equivalent requirements.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-17 A non-resettable four-digit (9,999) hour timer shall be installed and maintained on these units to indicate elapsed engine operating time.

Verification: At least thirty (30) days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the hour timer.

AQ-18 These units shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 50 hours per year for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the 50 hour per year limit.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-19 The hour limit of **AQ-18** can be exceeded when the emergency fire pump assemblies are driven directly by a stationary diesel fueled CI engine when operated per and in accord with the National Fire Protection Association (NFPA) 25 - "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 2006 edition or the most current edition approved by the CARB Executive Officer. [Title 17 CCR 93115(c)16]

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-20 The owner/operator shall maintain a operations log for these units current and on-site, either at the engine location or at a on-site location, for a minimum of two (2) years, and for another year where it can be made available to the District staff within 5 working days from the District's request, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:

a. Date of each use and duration of each use (in hours);
b. Reason for use (testing & maintenance, emergency, required emission testing);
c. Calendar year operation in terms of fuel consumption (in gallons) and total hours; ~~and,~~
d. Fuel sulfur concentration (the owner/operator may use the supplier's certification of sulfur content if it is maintained as part of this log)~~.~~; and
e. Documentation of maintenance as per manufacturer's recommendations and good maintenance practices.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-21 These fire protection units are subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these conditions and the ATCM, the more stringent requirements shall govern.

Verification: Not necessary.

AQ-22 This unit is subject to the requirements of the Federal New Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines (40 CFR Part 60 Subpart IIII).

Verification: The project owner shall submit to the District and the CPM the engine specifications at least 30 days prior to purchasing the engines for review and approval demonstrating that the engines meet NSPS emission limit requirements at the time of engine purchase.

Conditions Applicable to Ivanpah I, II, and III Emergency Generators, MDAQMD Application Numbers/Permit Numbers; 00009313 (E010381), 00009316 (E010379), and 00009317 (E010382)

Equipment Description:

Year of Manufacture 2010, Tier II, One Caterpillar, Diesel fired internal combustion engine, Model No. 3516C-HD, and Serial No. tbd, After Cooled, Direct Injected, Turbo Charged, producing 3,750 bhp with 16 cylinders at 1,800 rpm (or equiv.) while consuming a maximum of 173 gal/hr. This equipment powers a Generator.

These conditions (AQ-23 through AQ-31) apply separately to all three emergency generator engines unless otherwise specified.

AQ-23 Engine may operate in response to notification of impending rotating outage if the area utility has ordered rotating outages in the area where the engine is located or expects to order such outages at a particular time, the engine is located in the area subject to the rotating outage, the engine is operated no more than 30 minutes prior to the forecasted outage, and the engine is shut down immediately after the utility advises that the outage is no longer imminent or in effect.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-24 This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15ppm) on a weight per weight basis per CARB Diesel or equivalent requirements.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-25 This equipment shall be installed, operated and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-26 A non-resettable four-digit (9,999) hour timer shall be installed and maintained on this unit to indicate elapsed engine operating time.

Verification: At least thirty (30) days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the hour timer.

AQ-27 This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 50 hours per year, and no more than 0.5 hours per day for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the 50 hour per year limit.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-28 The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:

a. Date of each use and duration of each use (in hours);
b. Reason for use (testing & maintenance, emergency, required emission testing);
c. Calendar year operation in terms of fuel consumption (in gallons) and total hours;
d. Fuel sulfur concentration (the owner/operator may use the supplier's certification of sulfur content if it is maintained as part of this log) and,
e. Documentation of maintenance as per manufacturer's recommendations and good maintenance practices.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-29 This genset is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these conditions and the ATCM, the more stringent requirements shall govern.

Verification: Not necessary.

AQ-30 This unit shall not be used to provide power during a voluntary agreed to power outage and/or power reduction initiated under an Interruptible Service Contract (ISC); Demand Response Program

(DRP); Load Reduction Program (LRP) and/or similar arrangement(s) with the electrical power supplier.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-31 This unit is subject to the requirements of the Federal New Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines (40 CFR Part 60 Subpart IIII).

Verification: The project owner shall submit the engine specifications at least 30 days prior to purchasing the engines for review and approval demonstrating that the engines meet NSPS emission limit requirements at the time of engine purchase.

C. PUBLIC HEALTH

The public health analysis supplements the previous discussion on air quality and considers the potential public health effects from project emissions of toxic air contaminants. In this analysis, we review the evidence concerning whether such emissions will result in significant public health impacts or violate standards for public health protection.[1] The evidence on this topic was undisputed. (Exs. 1, §§ 5.1.6.6, 5.9; 57; 65; Ex. 300, pp. 6.6-1 to 6.7-25; 12/14/09 RT 304 to 307.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

Project construction and operation will result in routine emissions of toxic air contaminants for which no ambient air quality standards have been established. These substances are categorized as noncriteria pollutants. In the absence of standards, state and federal regulatory agencies have developed health risk assessment procedures to evaluate potential health effects due to these toxic air contaminants.

The risk assessment consists of the following steps:

- Identify the types and amounts of hazardous substances that the Ivanpah Solar Electric Generating System (ISEGS) could emit into the environment;
- Estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
- Estimate amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact;[2] and
- Characterize potential health risks by comparing worst-case exposure from the project with the scientific safety standards based on known health effects. (Ex. 300, p. 6.7-6.)

Typically, the initial health risk analysis is performed at a "screening level," which is designed to estimate potential health risks. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case,

[1] This Decision discusses other potential public health concerns under various topics. For instance, the accidental release of hazardous materials is discussed in **Hazardous Materials Management** and **Worker Safety and Fire Protection**. Electromagnetic fields are discussed in **Transmission Line Safety and Nuisance**. Potential impacts to soils and surface water sources are discussed in the **Soil and Water Resources** section. Potential exposure to contaminated soils and hazardous wastes is described in **Waste Management**. (Ex. 300, p. 6.7-1.)

[2] 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.

risks and then modeling those conditions to analyze results. Such conditions include:

- Using the highest levels of pollutants that could be emitted from the power plant;
- Assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- Using the type of air quality computer model which predicts the greatest plausible impacts;
- Calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- Assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
- Using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses). (Ex. 300, pp. 6.7-6 to 6.7-7.)

The risk assessment addresses three categories of potential health impacts: acute (short-term) health effects; chronic (long-term) non-cancer effects; and cancer risk (also long-term).

Acute health effects result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Chronic non-cancer health effects occur as a result of long-term exposure (8 to 70 years) to lower concentrations of pollutants. For carcinogenic substances, the health assessment considers the total risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime.

The analysis for acute and chronic health effects compares the maximum project contaminant levels to safe levels called Reference Exposure Levels or RELs. These exposure levels are designed to protect the most sensitive individuals in the population such as infants, the elderly, and people suffering from illness or disease, which make them more susceptible to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effects reported in medical and toxicological literature, and include margins of safety.

The assessment considers risk from all cancer-causing chemicals from the source of emissions. The calculated risk is not meant to predict the actual expected incidence of cancer, but is rather a theoretical estimate based on worst-case 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, and the length of the exposure period. The State of California has determined 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. (CITE.) This risk level is equivalent to a cancer risk of 10 in one million, or $10x10^{-6}$. The Mojave Desert Air Quality Management District, the jurisdiction in which ISEGS is located, also uses 10 in one million as the level of "Significant Health Risk." The conservative nature of the screening assumptions means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated. (Ex. 300, pp. 6.7-7 to 6.7-9.)

If the screening analysis predicts no significant risks, then no further analysis is required. However, if the predicted risk is significant, then further analysis using more realistic, site-specific assumptions is performed to obtain a more accurate assessment of potential health risks. If the site-specific analysis confirms that the risk exceeds the significance level, then appropriate mitigation measures are necessary to reduce the risk to less than significant. If a refined analysis identifies a cancer risk that exceeds the significance level after all risk reduction measures have been considered, then Staff would not recommend approval of the project. (Ex. 300, p. 6.7-9.)

The evidence shows that both the Applicant and Staff independently performed screening risk assessments and concluded that no adverse health effects are expected from project construction or operation.

1. Construction

Construction of the three power plants of ISEGS is anticipated to take place over a period of 48 months, with each phase taking about 24 months to complete and with 12 months of overlap between the construction of any of the two power plants at one time. Potential construction-phase health impacts could occur from exposure to toxic substances in contaminated soil disturbed during site preparation and to diesel exhaust from heavy equipment. Excavation, grading, and earth moving activities have potential to affect public health through mechanisms such as windblown dust, soil erosion, and the uncovering of hazardous substances.

If any unexpected contamination is encountered during construction, then compliance with Conditions of Certification **Waste Management Waste-1** and **Waste-2** will ensure that contaminated soil does not affect the public. These conditions require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil.

With respect to the air emissions from diesel-fueled engines, the Applicant estimated worst-case emission of 267.38 pounds per day of particulate matter less than 10 microns in diameter (PM 10) and 57.56 pounds per day of particulate matter less than 2.5 microns in diameter (PM 2.5) during construction. The maximum carcinogenic risk from exposure to carcinogenic risk from exposure to diesel emissions during 32 months of construction (not including 15 months of vegetation removal and using average annual emissions for the peak construction period) was modeled using the ARB/OEHHA Hotspots Analysis and Reporting Program. The expected cancer risk is estimated to be between 0.3 and 0.5 in 1 million in the immediate vicinity of the ISEGS site. According to the Applicant, this estimate is over-predicted due to the conservative nature of the modeling. (Ex. 1, §5.1.6.6, App. 5.1F, pp. 5.9-7 to 5.9-8; 300, p. 6.7-11.)

Notably, the Applicant's estimated maximum 24-hour emissions of PM10 exceed the federal Prevention of Significant Deterioration (PSD) level of significance. Thus, both the Applicant and Staff proposed – and we have adopted - Conditions of Certification **Air Quality AQ-SC3** and **AQ-SC7** to reduce the maximum calculated PM 10 emissions.

To further mitigate potential impacts from particulate emissions during the operation of diesel-powered equipment. We have adopted Condition of Certification **Air Quality AQ-SC5**, which will reduce exposure to diesel emissions from construction equipment by requiring the use of ultra-low sulfur diesel fuel and Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines. If a Tier 3 engine is not available for off-road equipment larger than 100 hp, then the installation of an oxidation catalyst and soot filters on diesel equipment is required.

2. Operation

During operation, ISEGS emission sources will include three partial-load gas fired steam boilers, three emergency diesel fire pumps, and three emergency diesel generators, for a total of nine emitting sources. The partial-load steam

boilers would be used during startup and periods of cloud cover would be expected to average about 1 hour per day and not exceed 4 hours per day. On an annual basis, the partial-load steam boilers for each power plant would not exceed a total annual natural gas fuel heat input that is more than 5 percent of the total annual heat input from the sun in accordance with **Air Quality** Condition of Certification **AQ-SC10.**

The record includes the methodology used in identifying and quantifying the emission rates of the toxic noncriteria pollutants that could adversely affect public health. More particularly, the evidence includes a listing of ISEGS's potential toxic emissions and shows how each contributes to the health risk analysis, a quantification of each under a worst-case analysis, and an assessment of impacts. (Exs. 1, pp. 5.9-8 to 5.9-10; 300, pp. 6.7-12 to 6.7-19.)

The Applicant's screening health risk assessment resulted in a maximum acute Hazard Index (HI) of 0.013 and a maximum chronic HI of 0.00001. Both indices are less than 1.0, thereby indicating that no short-or long-term adverse health effects are expected. The Applicant also determined that the total worst-case individual cancer risk is 0.065 in 1 million at the location of maximum impact, which is below the $10x10^{-6}$ level of significance. (Ex.1, p. 5.9-10; 300, p. 6.7-13 to 6.7-14.)

Staff performed an independent analysis of cancer risks and acute and chronic hazards, using the Applicant's emission factors and considering the following receptor locations:

- Point of maximum impact (PMI), approximately 500 meters (1,640 feet) south of the southern boundary of Ivanpah 1 (70-year residential scenario)
- Location of the nearest residence specified in the AFC, approximately 5.6 miles (9.1 km) northeast of the center of the project (70-year residential scenario)
- Location of the nearest residence identified during a site visit by Staff (at a mobile home located to the southeast of the intersection of Interstate 15 and Yates Well Road), approximately 3.1 miles (5.0 km) southeast of the center of the project (70-year residential scenario)
- Clubhouse at Primm Valley Golf Club, approximately 2.5 miles (4.0 km) east of the center of the project (recreational scenario assuming exposure of 5 hours/day, 2 days/week, 52 weeks/year for 70 years)
- Clubhouse at Primm Valley Golf Club (occupational scenario assuming exposure of 8 hours/day, 50 weeks/year for 35 years) (Ex. 300, p. 6.7-15.)

Staff similarly concluded that the risk assessment results show that both acute and chronic HIs are less than 1.0, indicating that no short- or long-term adverse health effects are expected. (Ex. 300, pp. 6.7-14 to 6.7-19.)

3. Cumulative Impacts

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code Regs., tit. 14, § 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR §1508.7.)

The evidence includes an evaluation of the potential cumulative impacts that might occur if ISEGS Project impacts combined with impacts of projects located within the Ivanpah Valley or the vast area over which future solar and wind projects would be built in southeastern California, southern Nevada, and western Arizona. The evidence shows that the incremental impact of the additional risk posed by the ISEGS project is neither individually nor cumulatively significant. (Ex. 300, pp. 6.7-20 to 6.7-22.)

4. Public Benefits

The evidence shows that a solar electric generating facility such as the proposed ISEGS Project would emit significantly less toxic air contaminants (TACs) to the environment than other energy sources available in California such as natural gas or biomass, thereby reducing the health risks that would otherwise occur with these non-renewable energy sources. At the same time, the proposed ISEGS would provide much needed electrical power to California residences and businesses, and will contribute to electric reliability.

The Commission makes the following findings and conclusions:

FINDINGS OF FACT

1. Construction and operation of the project will result in the routine release of criteria and noncriteria pollutants that have the potential to adversely impact public health.

2. Exposure to diesel particulate emissions from construction equipment is short-term and will not result in long-term carcinogenic or non-cancer effects.

3. Exposure to construction-related diesel particulates will be mitigated to the extent feasible by implementing measures to reduce equipment emissions.

4. Exposure to fugitive dust due to excavation and construction activities will be mitigated to insignificant levels by implementing measures to reduce dust production and dispersal.

5. Emissions of criteria pollutants, as discussed in the **AIR QUALITY** section of this Decision, will be mitigated to levels consistent with applicable state and federal standards.

6. Emissions of noncriteria pollutants or toxic air contaminants are assessed according to procedures developed by state and federal regulatory agencies to evaluate potential health effects.

7. Both the Applicant and Staff performed a screening health risk assessment of the project's potential health effects due to emissions of toxic air contaminants.

8. Emissions of toxic air contaminants from the project will not cause acute or chronic non-cancer adverse public health effects or long-term carcinogenic effects at the points of maximum impact.

9. The maximum cancer and non-cancer health risks associated with the project are below the significance thresholds commonly accepted for risk analysis purposes.

10. Since the project's contributions to health risks are well below the significance level, the project is not expected to contribute significantly to a cumulative health impact.

CONCLUSIONS OF LAW

1. Project emissions of toxic air contaminants do not pose a significant direct, indirect, or cumulative adverse public health risk.

2. With the implementation of the Conditions of Certification listed in the **Air Quality** and **Waste Management** and sections of this Decision, the project will not result in significant public health impacts during construction or operation.

3. The project will comply with the applicable laws, ordinances, regulations, and standards specified in the appropriate portion of **Appendix A** of this Decision.

D. WORKER SAFETY AND FIRE PROTECTION

Industrial workers are exposed to potential health and safety hazards on a daily basis. Implementation of various existing laws and standards suffices to reduce these hazards to minimal levels. (Ex. 300, p. 6.14-3.) Therefore, this subsection focuses on whether Applicant's proposed health and safety plans are in accordance with all applicable LORS and thus adequate to protect industrial workers. The record also addresses the availability and adequacy of fire protection and emergency response services, as well as potential threats from wildfires. The evidence on this topic was uncontested and unaffected by the "Mitigated Ivanpah 3" submission.[1] (12/14/09 RT 305-07; 1/13/2010 RT 29-36; Exs. 1; 40; 57; 65, pp. 661 to 666; 88, p. 3-14; 300, § 6.14; 303, pp. 43 to 45; 315.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Worker Safety

Industrial environments are potentially dangerous during construction, operation, and demolition activities. Workers at the ISEGS Project will be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and various other injuries. They may be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, electrical sparks, and electrocution. (Ex. 300, p. 6.14-4.)

This power plant presents a work environment that includes a solar field located in the high desert. The area under the solar arrays must be kept free from weeds by applying herbicides as necessary. Inhalation and ingestion of dusts containing herbicides can pose a health risk. Cleaning and servicing the mirrors will be conducted on a routine schedule. These activities will take place year-round, especially during the summer months of peak solar power generation when outside ambient temperatures routinely reach 115º Fahrenheit and above. (Ex. 300, p. 6.14-9.) Thus, it is important that the project have well-defined policies and procedures, training, hazard recognition, and controls to minimize injuries and protect workers.

[1] Intervenor Center for Biological Diversity raised concerns regarding the risk of fire and the off-site effects upon wildlands. This matter is addressed under the **Biological Resources** section of this Decision. (1/13/2010 RT 29-30, 32.)

The evidence extensively details the type and content of various plans which must be developed to ensure the protection of worker health and safety, as well as compliance with applicable LORS. (Ex. 300, pp. 6.14-4 to 6.14-8.) For example, the project owner must develop and implement a "Construction Safety and Health Program" and an "Operations and Maintenance Safety and Health Program," both of which will be reviewed by BLM's Authorized Officer and the Compliance Project Manager prior to project construction and operation. A separate "Injury and Illness Prevention Program," a "Personal Protective Equipment Program," an "Emergency Action Plan," a "Fire Prevention Plan," and other general safety procedures must be prepared for both the construction and operation phases of the project. (Exs. 300, pp. 6.14-4 to 6.14-8; 303, pp. 43 to 44.) Conditions of Certification **WORKER SAFETY-1** and **-2** ensure that these measures will be developed and implemented. Condition **WORKER SAFETY-6** requires the development and implementation of Best Management Practices (BMPs) for the storage and application of herbicides used to control weeds beneath and around the solar array. [2]

OSHA and Cal-OSHA standards encourage employers to monitor worker safety by employing a "competent person" who has knowledge and experience enforcing workplace safety standards, can identify hazards relating to specific project operations, and has authority to take appropriate action. To implement the intent to provide a safe workplace during power plant construction, Condition **WORKER SAFETY-3** requires the project owner to designate a power plant Construction Safety Supervisor. This individual will coordinate and implement the Construction and Operation Safety and Health programs, as well as investigate any safety-related incidents and emergency responses. (Ex. 300, p. 6.14-10.)

To reduce and/or eliminate safety hazards during project construction and operation, it is also necessary to employ a professional Safety Monitor. The Safety Monitor, who is hired by the project owner but reports to the Chief Building Official, BLM's Authorized Officer, and the Compliance Project Manager, will track compliance with OSHA/Cal-OSHA regulations and serve as an on-site OSHA expert. This professional will periodically audit safety compliance during construction, commissioning, and the transition to operational status as well as ensure that safety procedures and practices are fully implemented. (Ex. 300, p. 6.14-11.) Condition **WORKER SAFETY-4** describes the role of the Safety Monitor.

[2] Condition **BIO-13** also guides the application of herbicides in accordance with the Weed Management Plan. (Ex. 300, p. 6.14-9.)

The project owner will also maintain an automatic portable defibrillator on-site to provide immediate response in the event of medical emergency.[3] Condition **WORKER SAFETY-5** requires the project owner to ensure this device is available during construction and operation, and that appropriate personnel are trained to use it. (Ex. 300, p. 6.14-13.)

2. Fire Protection and Emergency Response

Project construction and operation pose the potential for both small fires and major structural fires. Electrical sparks, combustion of diesel fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid or flammable liquids, explosions, and over-heated equipment may cause small fires. Wildfires that use local vegetation as fuel could also potentially effect workers and project facilities.[4]

The project will rely upon both on-site and local fire protection services. The on-site fire protection system provides the first line of defense for such occurrences. The Construction Fire Prevention Plan (Condition **WORKER SAFETY-1**) must address and detail measures to minimize the likelihood of fires during construction. These measures include the placement of portable fire extinguishers, safety procedures, and training. San Bernardino County Fire Department's (SBCFD) Station 53 in Baker, California, will provide fire protection back-up for larger fires that cannot be extinguished using the project's portable fire suppression equipment. (Ex. 300, p. 6.4-12.)

During operation, the project will meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended National Fire Protection Association (NFPA) standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements. Fire suppression elements will include both fixed and portable fire extinguishing systems.

The fire protection system will be designed to protect personnel and limit property loss and plant downtime in the event of a fire. The primary source of fire protection water will be stored in the 250,000 gallon raw water storage tank

[3] Staff's testimony indicates that the potential for both work-related and non work-related heart attacks exists at power plants. The quickest medical intervention can be achieved with the use of an on-site defibrillator. Many modern industrial and commercial enterprises maintain defibrillators for emergency use. Staff therefore endorses this as an appropriate safety and health precaution. (Ex. 300, p. 6.14-13.)

[4] These are not expected to be caused by the project. Wildfires external to the ISEGS project boundaries are not the responsibility of the project owner to suppress.

located in each power block. Approximately 100,000 gallons will be usable for plant process needs, with 150,000 gallons reserved for fire protection. An electric jockey pump and electric motor-driven main fire pump will be provided to increase the water pressure to the level required to serve all fire fighting systems. In addition, a back-up diesel engine-driven fire pump will be provided to pressurize the fire loop if the power supply to the electric motor-driven main fire pump fails. All fire protection systems will focus on the power blocks, administration/warehouse building, and other areas of active operations. (Ex. 300, p. 6.14-12.) In addition to the fixed fire protection system, smoke detectors, flame detectors, high temperature detectors, appropriate class of service portable extinguishers, and fire hydrants will be located throughout the facility at code-approved intervals. These systems are standard requirements of the NFPA and the Uniform Fire Code (UFC). (Ex. 300, p. 6.14-13.)

Wildfire protective measures will reduce the potential for harm to plant personnel and damage to facilities. All vegetation in the vicinity of the solar power towers, power blocks, substation, and administration areas will be removed and vegetation in the solar fields will be cut and maintained to about 12-18 inches high. The access road along the perimeter fence lines will also serve as a fire break. (Ex. 300, pp. 6.14-11 to 6.14-12.)

Local fire support services are under the jurisdiction of the SBCFD. Station 53, 40 miles from the project site and located in Baker, California, will be the first responder to ISEGS, with a response time of approximately 45 minutes. SBCFD also has a Mutual Aid Agreement with Clark County (Nevada) Fire Department for responses requiring more assistance. (Ex. 300, p. 6.14-3.)

Hazardous materials permits and spills are also handled and investigated by SBCFD. San Bernardino County firefighters receive specialized training for emergency responses to industrial hazards. Because of the highly remote and rural area, services are limited and spread out. The response time to the project site, with full resources including those for large-scale hazardous materials spills, will be 3 to 4 hours. Hazardous materials response comes from SBCFD Station 78, in the town of Fontana. (Ex. 300, pp. 6.14-3, 6.14-12.)

The evidence shows that these resources comprise adequate fire protection and emergency response capabilities. (*Id.*) Conditions of Certification **WORKER SAFETY-1** and **-2** require the project owner, prior to construction and operation of the project, to provide the final Fire Prevention Program to BLM's Authorized Officer, the Compliance Project Manager, and the local fire authorities. These

entities will then confirm its adequacy. (Exs. 300, pp. 6.14-12 to 6.14-13; 303, pp. 43 to 44.) Finally, the record shows that the limited fire risks and potential for hazardous materials incidents at the facility do not pose significant added demands on local fire protection services. (Ex. 300, p. 6.14-14.)

FINDINGS OF FACT

Based on the uncontroverted evidence, the Commission makes the following findings:

1. Industrial workers are exposed to potential health and safety hazards on a daily basis.

2. To protect workers from job-related injuries and illnesses, the project owner will implement comprehensive Safety and Health Programs for both the construction and the operation phases of the project.

3. The project will employ an on-site professional Safety Monitor during construction and operation.

4. The ISEGS Project will include on-site fire protection and suppression systems as the first line of defense in the event of a fire.

5. The San Bernardino County Fire Department (SBCFD) will provide fire protection and emergency response services to the project.

6. Existing fire and emergency service resources are adequate to meet project needs.

CONCLUSION OF LAW

1. We therefore conclude that the ISEGS Project will not create significant health and safety impacts to workers, and will comply with all applicable laws, ordinances, regulations, and standards listed in the appropriate portion of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to BLM's Authorized Officer and the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- A Construction Personal Protective Equipment Program;

- A Construction Exposure Monitoring Program;
- A Construction Injury and Illness Prevention Program;
- A Construction Emergency Action Plan; and
- A Construction Fire Prevention Plan.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to BLM's Authorized Officer and the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the BLM's Authorized Officer and CPM from the San Bernardino County Fire Department, if any is received, stating the Fire Department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to BLM's Authorized Officer and the CPM for review and approval concerning compliance of the program with all applicable Safety Orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the San Bernardino County Fire Department for review and comment prior to submittal to the BLM's Authorized Officer and CPM for approval.

WORKER SAFETY-2 The project owner shall submit to BLM's Authorized Officer and the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- An Operation Injury and Illness Prevention Plan;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Program (8 CCR § 3221); and
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

Verification: At least 30 days prior to the start of first-fire or commissioning, the project owner shall submit to BLM's Authorized Officer and the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a letter to BLM's Authorized Officer and the CPM from the San Bernardino County Fire Department, if any is received, stating the Fire Department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to BLM's Authorized Officer and the CPM for review and approval concerning compliance of the program with all applicable Safety Orders. The Operation Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the San Bernardino County Fire Department for review and comment.

WORKER SAFETY-3 The project owner shall 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, is capable of identifying workplace hazards relating to the construction activities, and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- Have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- Assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Complete accident and safety-related incident investigations, emergency response reports for injuries, and inform BLM's Authorized Officer and the CPM of safety-related incidents; and
- Assure that all the plans identified in **WORKER SAFETY-1 and -2** are implemented.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to BLM's Authorized Officer and the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement (CSS) shall be submitted to BLM's Authorized Officer and the CPM within three business days.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report which includes:

- a record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- a summary report of safety management actions and safety-related incidents that occurred during the month;
- a report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- a report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO, and is responsible for verifying that the Construction Safety Supervisor, as required in **WORKER SAFETY-3**, implements all applicable Cal/OSHA and Commission safety

requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: At least 30 days prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to BLM's Authorized Officer and the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic external defibrillator (AED) is located on-site during construction and operations, shall implement a program to ensure that workers are properly trained in its use, and shall ensure that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in its use and shall be on-site whenever the workers that they supervise are on-site: the Construction Project Manager or delegate; the Construction Safety Supervisor or delegate; and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to BLM's Authorized Officer and the CPM for review and approval.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to BLM's Authorized Officer and the CPM proof that a portable AED exists on-site and provide a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 The project owner shall prepare and implement Best Management Practices (BMPs) for the storage and application of herbicides used to control weeds beneath and around the solar array. These plans shall be submitted to BLM's Authorized Officer and the CPM for review and approval.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to BLM's Authorized Officer and the CPM, for review and approval, a copy of the Best Management Practices (BMPs) for the storage and application of herbicides.

E. HAZARDOUS MATERIALS MANAGEMENT

This section considers whether the construction and operation of the ISEGS Project will create significant impacts to public health and safety resulting from the use, handling, transportation, or storage of hazardous materials.[1] Several locational factors affect the potential for project-related hazardous materials to cause adverse impacts. These include meteorological conditions, terrain characteristics, any special site factors, and the proximity of population centers and sensitive receptors. In addition, sensitive subgroups such as the young, the elderly, and those with existing conditions may be at heightened risk from exposure to emitted pollutants.[2] (Ex. 300, p. C.4-2.)

The evidence presented on this topic was uncontested.

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Potential Risks

The evidence chronicles the method used to assess risks posed by hazardous materials. This method included the following elements:

- A review of chemicals, the amounts proposed for on-site use, and a determination of the need and appropriateness of their use.
- Chemicals which would be used in small amounts, or whose physical state is such that there is virtually no chance that a spill would migrate off the site and impact the public, were removed from further consideration.
- Measures proposed to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different size transfer-hose couplings, as well as administrative controls such as worker training and safety management programs.
- Measures proposed to respond to accidents were reviewed and evaluated. These included engineering controls such as catchment basins and methods to keep vapors from spreading, as well as administrative controls such as training emergency response crews.

[1] The **Worker Safety and Fire Protection** portion of this Decision addresses the protection of workers from such risks.

[2] In this instance, there are no sensitive receptors within a 6-mile radius of the project vicinity. (Ex. 300, p. 6.4-6.)

- An analysis of the theoretical impacts on the public of a worst-case spill of hazardous materials even with the mitigation measures in place. (Ex. 300, pp. 6.4-6 to 6.4-7.)

Hazardous materials used during construction will include gasoline, diesel fuel, motor oil, welding gases, lubricants, solvents, paint, and cleaners. These will be used in small quantities, and any spills or other releases will be confined to the site. No acutely toxic materials will be used on-site during construction. During operations, hazardous materials such as sulfuric acid, sodium hydroxide, and ammonium hydroxide will be used or stored only in small quantities; these present limited off-site dangers because of their low volatility and/or toxicity. (Ex. 300, pp. 6.4-7 to 6.4-8.)

ATTACHMENT A (incorporated in Condition of Certification **HAZ-1** at the end of this section) lists the hazardous materials that will be used and stored on-site. Condition **HAZ-1** prohibits the project owner from using hazardous materials not listed in **ATTACHMENT A**, or storing them in greater quantities than specified, without prior approval of the BLM's Authorized Officer and the Energy Commission's Compliance Project Manager. (Ex. 300, pp. 6.4-9 to 6.4-10.) None of these materials, except for natural gas as discussed below, pose 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. (Ex. 300, pp. 6.4-7 to 6.4-8.)

a. Natural Gas

Project operations will involve the handling – but not storage – of significant quantities of natural gas. The solar heat used in the boiler (steam) process will be supplemented by burning natural gas to heat a partial load steam boiler when solar conditions are insufficient. Each power plant within the project includes a small natural gas-fired start-up boiler to provide additional heat for plant start-up and during temporary cloud cover. Natural gas will be supplied from the Kern River Gas Transmission Pipeline through a six-mile long distribution pipeline ranging from 4 to 6 inches in diameter. The new pipeline will extend 0.5 miles south to the northern edge of Ivanpah 3. Extensions of the pipeline into the power blocks will be located within the project fenceline. Sections of the pipeline along the northern boundary of Ivanpah 3, and the eastern boundaries of the Ivanpah 3 and 2, will be located outside of the fenced heliostat area in order to allow access to the pipeline for maintenance.

A tap metering station approximately 100 feet by 150 feet in area will be located at the Kern River Gas Transmission Line. Facilities will be installed at the tap station to regulate the gas pressure, to remove any liquids or solid particles, and to facilitate pipeline inspection and cleaning. In addition to the tap station, separate metering sets will be installed for each of the power plants. (Ex. 300, p. 6.4-2.)

The evidence shows that, while natural gas poses some risk of both fire and explosion, this risk will be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. For example, National Fire Protection Association (NFPA) Code 85A requires both the use of double-block and bleed valves for gas shut-off and automated combustion controls. These measures significantly reduce the likelihood of an explosion in gas-fired equipment. The Safety Management Plan must address the handling and use of natural gas, and the evidence establishes that it will significantly reduce the potential for equipment failure because of either improper maintenance or human error. (Ex. 300, p. 6.4-8.)

2. Risk Mitigation

a. Engineering and Administrative Controls

Engineering controls and administrative controls affect the significance of potential impacts from hazardous materials usage. Engineering controls are those physical or mechanical systems (such as storage tanks or automatic shut-off valves) which can prevent a hazardous material spill from occurring, which can limit the spill to a small amount, or which can confine it to a small area. Administrative controls are those rules and procedures that workers at the facility must follow. These are designed to help prevent accidents or keep them small if they do occur. Timely and adequate emergency spill response is also a crucial factor. (Ex. 300, p. 6.4-6.)

The engineered safety features which will be used at the ISEGS Project include:

- Use of secondary containment areas, surrounding each of the hazardous materials storage areas, designed to contain accidental releases that might happen during storage:
- 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. (Ex. 300, p. 6.4-9.)

Administrative controls, such as those required in Conditions of Certification **HAZ-1** (limitations on the use and storage of hazardous materials and their strength and volume) and Condition **HAZ-2** (development of a Hazardous Materials Business Plan) also help prevent accidents and spills from moving off-site and affecting neighboring communities. For example, the Business Plan will incorporate state requirements for the handling of hazardous materials. Condition of Certification **HAZ-2** also ensures that this Plan, which includes the Inventory and Site Map, Emergency Response Plan, Owner/Operator Identification, and Employee Training is provided to the SBCFD so that it can better prepare emergency response personnel for handling potential emergencies at the facility. In accordance with Condition of Certification **HAZ-3**, the project owner must also develop and implement a Safety Management Plan for delivery of liquid hazardous materials. This 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. The Safety Management Plan will be applicable during construction, commissioning, and operation of ISEGS. (Ex. 300, p. 6.4-10.)

The SBCFD is responsible for reviewing Hazardous Materials Business Plans. (Ex. 300, p. 6.4-5.) The San Bernardino County HazMat Team is currently based at Fire Station No.78, in Fontana, California (approximately 175 miles from the project site). Its response time to a hazmat emergency call from ISEGS is approximately 3 hours. The evidence indicates that, given the remote location, this response time is acceptable and that the HazMat Team is adequately trained and equipped to respond to an emergency at ISEGS. The project's remote location eliminates the risk of off-site consequences to the public. (*Id*.)

Furthermore, worker training programs, process safety management programs, and compliance with all applicable health and safety laws, ordinances, and standards will reduce risks. The project owner's worker health and safety program will include (but not be limited to) the following elements:

- Worker training regarding chemical hazards, health and safety issues, and hazard communications;
- Procedures to ensure the proper use of personal protective equipment;
- Safety procedures for the operation and maintenance of systems utilizing hazardous materials;

- Fire safety and prevention; and
- Emergency response actions including facility evacuation, hazardous material spill clean-up, and fire prevention. (Ex. 300, p. 6.4-9.)

b. Transportation

Containerized hazardous materials such as sulfuric acid and cleaning chemicals will be transported to the facility via truck. These materials can be released during a transportation accident, and the extent of their impact in the event of a release depends on the location of the accident and the rate of vapor dispersion from the surface of the spilled pool. The likelihood of an accidental release during transport is dependent upon three factors:

- The skill of the tanker truck driver;
- The type of vehicle used for transport; and
- Accident rates.

The evidence shows that the risk of an accidental transportation release in the project area was evaluated. The analysis focused on the project area after the delivery vehicle leaves the main Interstate highway (I-15). The evidence indicates that an extensive regulatory program applies to shipment of hazardous materials on California highways to ensure safe handling in general transportation. These regulations also address issues of driver competence, and compliance with the regulatory scheme suffices to alleviate significant concerns over transportation risks. (Ex. 300, p. 6.4-11.)

3. Site Security

The evidence establishes that a minimum level of security measures is appropriate in order to protect California's electrical infrastructure from malicious mischief, vandalism, or terrorist attack. (Ex. 300, pp. 6.4-12 to 6.4-13.) The facility will thus use special site security measures during both the construction and operation phases to prevent unauthorized access.

Perimeter fencing and breach detectors will be used. Site personnel will undergo background checks and site access will be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleet and employ only properly licensed and trained drivers. The project

owner is required, through the use of contractual language with vendors, to ensure that the hazardous materials suppliers strictly adhere to the U.S. DOT requirements to prepare and implement security plans and to ensure that all hazardous materials drivers are in compliance through personnel background security checks. The BLM's Authorized Officer and the compliance project manager (CPM) may authorize modifications to these measures or may require additional measures in response to guidance provided by the U.S. Department of Homeland Security, the U.S. DOE, or the NERC after consultation with both appropriate law enforcement agencies and the project owner. (Ex. 300, p. 6.4-13.)

Conditions of Certification **HAZ-4** and **HAZ-5** embody these requirements.

FINDINGS OF FACT

Based on the uncontested evidence, we make the following findings:

1. The ISEGS Project will use hazardous materials during construction and operation.

2. The major public health and safety danger associated with the project from hazardous materials use is fire and explosion from natural gas.

3. The risk of fire and explosion from natural gas will be reduced to insignificant levels through adherence to applicable codes and the implementation of effective safety management practices.

4. Potential impacts from the other hazardous substances used on-site are not significant since quantities will be limited and appropriate storage will be maintained in accordance with applicable law.

5. There is no possibility of cumulative impacts originating from simultaneous releases of hazardous materials from the ISEGS Project and nearby facilities.

6. Local emergency responders are adequately equipped and trained to deal with hazardous materials accidents at the ISEGS Project.

7. Implementation of the mitigation measures described in the evidence and contained in the Conditions of Certification, below, ensures that the project will not cause significant impacts to public health and safety as the result of handling, use, storage, or transportation of hazardous materials.

8. With implementation of the Conditions of Certification, below, the ISEGS Project will comply with all applicable laws, ordinances, regulations, and standards related to hazardous materials management as identified in the evidentiary record and in the pertinent portion of **Appendix A** of this Decision.

CONCLUSION OF LAW

1. The Commission concludes, therefore, that the storage, use, handling, and transportation of hazardous materials associated with the ISEGS Project will not result in any significant direct or cumulative adverse public health and safety impacts.

CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in **Hazardous Materials Attachment A**, below, or in greater quantities than those identified by chemical name in **Hazardous Materials Attachment A,** unless approved in advance by the BLM's Authorized Officer and the Compliance Project Manager (CPM).

Verification: The project owner shall provide to BLM's Authorized Officer and the CPM, in the Annual Compliance Report, a list of hazardous materials contained at the facility.

HAZ-2 The project owner shall concurrently provide a Hazardous Materials Business Plan to the Hazardous Materials Division of the County of San Bernardino Fire Department, BLM's Authorized Officer, and the CPM for review. After receiving comments from the Hazardous Materials Division of the County of San Bernardino Fire Department, BLM's Authorized Officer, and the CPM, the project owner shall reflect all recommendations in the final documents. If no comments are received from the county within 30 days of submittal, the project owner may proceed with preparation of final documents upon receiving comments from BLM's Authorized Officer and the CPM. Copies of the final Hazardous Materials Business Plan shall then be provided to the Hazardous Materials Division of the County of San Bernardino Fire Department for information and to the BLM's Authorized Officer and CPM for approval.

Verification: At least 60 days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Hazardous Materials Business Plan to BLM's Authorized Officer and the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of liquid hazardous materials. The plan shall include

procedures, protective equipment requirements, training, and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least 60 days prior to the delivery of any liquid hazardous material to the facility, the project owner shall provide a Safety Management Plan as described above to BLM's Authorized Officer and the CPM for review and approval.

HAZ-4 Prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to BLM's Authorized Officer and the CPM for review and approval.

Verification: At least 30 days prior to commencing construction, the project owner shall notify BLM's Authorized Officer and the CPM that a site-specific Construction Security Plan is available for review and approval. The Construction Security Plan shall include the following:

1. Perimeter security consisting of fencing enclosing the construction area;
2. Security guards;
3. Site access control consisting of a check-in procedure or tag system for construction personnel and visitors;
4. Written standard procedures for employees, contractors, and vendors when encountering suspicious objects or packages on-site or off-site;
5. Protocol for contacting law enforcement, BLM's Authorized Officer, and the CPM in the event of suspicious activity or emergency; and
6. Evacuation procedures.

HAZ-5 The project owner shall prepare a site-specific Operation Security Plan for the operational phase which shall be made available to BLM's Authorized Officer and the CPM for review and approval. The project owner shall implement site security measures addressing physical site security and hazardous materials storage.

Verification: At least 30 days prior to the initial receipt of hazardous materials on-site, the project owner shall notify BLM's Authorized Officer and the CPM that a site-specific Operations Site Security Plan is available for review and approval. In the Annual Compliance Report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and updated certification statements are appended to the Operations Security Plan. In the Annual Compliance Report, the

project owner shall include a statement that the Operations Security Plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

The level of security to be implemented shall not be less than that described below (as per NERC 2002). The Operation Security Plan shall include the following:

1. Permanent full perimeter fence or wall, at least eight feet high around the Solar Field;

2. Main entrance security gate, either hand operable or motorized;

3. Evacuation procedures;

4. Protocol for contacting law enforcement, BLM's Authorized Officer, and the CPM in the event of suspicious activity or emergency or conduct endangering the facility, its employees, or contractors;

5. Written standard procedures for employees, contractors, and vendors when encountering suspicious objects or packages on-site or off-site;

6.a. A statement (refer to sample, Attachment "B") signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to ascertain the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law regarding security and privacy;

   b. A statement(s) (refer to sample, Attachment "C") signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by BLM's Authorized Officer and the CPM after consultation with the project owner) that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by BLM's Authorized Officer and the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractor personnel that visit the project site. Background investigations shall be restricted to ascertaining the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law regarding security and privacy.

7. Site access controls for employees, contractors, vendors, and visitors;

8. Closed Circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) capable of viewing, at a minimum, the main entrance gate; and

9. Additional measures to ensure adequate perimeter security consisting of either:

a. Security guard present 24 hours per day, seven days per week, **OR**

b. Power plant personnel on-site 24 hours per day, seven days per week and **all** of the following:

1. The CCTV monitoring system required in number 8 above shall include cameras that are able to pan, tilt, and zoom (PTZ), have low-light capability, are recordable, and are able to view 100% of the perimeter fence, the outside entrance to the control room, and the front gate from a monitor in the power plant control room; **AND**

2. Perimeter breach detectors **or** on-site motion detectors.

The project owner shall fully implement the security plans and obtain BLM's Authorized Officer and CPM approval of any substantive modifications to the security plans. BLM's Authorized Officer and the CPM may authorize modifications to these measures, or may require additional measures, such as protective barriers for critical power plant components (e.g., transformers, gas lines, compressors, etc.), depending on circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council after consultation with appropriate law enforcement agencies and the project owner.

HAZ-6 The holder (project owner) shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder(s) shall comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et seq.), with regard to any toxic substances that are used, generated by, or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b.

Verification: A copy of any report required or requested by any Federal or State governmental entity as a result of a reportable release or spill of any toxic substances shall be furnished to BLM's Authorized Officer and the CPM concurrent with the filing of the report with the involved Federal or State governmental entity.

HAZARDOUS MATERIALS
ATTACHMENT A

Hazardous Materials Used
at the
ISEGS Power Project

Hazardous Materials Attachment A

Hazardous Materials for Use at ISEGS

Trade Name	Chemical Name	CAS Number	Application	Maximum Quantity Onsite
Antiscalant (Permatreat PC-391)	Not Available	None	Antiscalant for boiler and steam turbine	70 gal
Cleaning chemicals/detergents	Various	None	Periodic cleaning of steam turbine	100 gal
Diesel No. 2	Oil	None	Fuel for fire pump engine/generators	9,000 gal
Hydraulic oil	Oil	None	High-pressure turbine starting system, turbine control valve actuators	500 gal
Lubrication oil	Oil	None	Lubricate rotating equipment (e.g., steam turbine bearings)	30,000 gal
Mineral insulating oil	Oil	8012-95-1	Transformers/switchyard	105,000 gal
Oxygen scavenger (Cortrol OS5607)	Carbonic Dyhdrazide	497-18-7	Oxygen scavenger for boiler cleaning solution and steam-water cycle	170 gal
Phosphate Treatment (Optisperse HP3100)	Sodium Hydroxide	1310-73-2	Phosphate treatment for boiler internal treatment	62 gal
Sodium Hydroxide Solution	Sodium hydroxide (30%)	1310-73-2	pH Control	170 gal
Steam Condensate Treatment (Steamate NA1321)	Ammonium Hydroxide	1336-21-6	Condensate and feedwater pH control	300 gal
Sulfuric Acid	Sulfuric acid (20%)	7664-93-9	pH control	670 gal
Lead Acid Batteries (Sulfuric Acid and Lead) size of batteries approx 10cm x 5cm x 7cm	Sulfuric acid (10%-30%) Lead (45-60%)	7664-93-9 7439-92-1	Electrical power	272,000 batteries
Sulfur hexafluoride	Sulfur hexafluoride	2551-62-4	Switchyard/switchgear devices	200 lb

a. Source: BSE2007a, Tables 5.5-3, 5.5-4

SAMPLE CERTIFICATION

(Attachments “B” and “C”)

SAMPLE CERTIFICATION (Attachment "B")

Affidavit of Compliance for Project Owners

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company Name)

for employment at

_____

(Project name and location)

have been conducted as required by the U.S. Bureau of Land Management Right-of-Way and California Energy Commission Decision for the above- named project.

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY BLM's AUTHORIZED OFFICER AND THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment "C")

Affidavit of Compliance for Contractors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company Name)

for contract work at

_____

(Project name and location)

have been conducted as required by the U.S. Bureau of Land Management Right-of-Way and California Energy Commission Decision for the above- named project.

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY BLM's AUTHORIZED OFFICER AND THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

F. WASTE MANAGEMENT

The Ivanpah Solar Electric Generating System (ISEGS) will generate nonhazardous and hazardous wastes during construction and operation. This section reviews the project's waste management plans for reducing the risks and environmental impacts associated with handling, storage, and disposal of project-related nonhazardous and hazardous wastes. The evidence on this topic was undisputed. (12/14/09 RT 305 to 307; Exs. 1, § 5.14; 2; 4; 14 (Waste Management 111i); 18; 57; 65; 300, pp. 6.13-1 to 6.13-20; 302; 303.)

Hazardous waste consists of materials that exceed criteria for toxicity, corrosivity, ignitability, or reactivity as established by the California Department of Toxic Substances Control (DTSC).[1] State law requires hazardous waste generators to obtain U.S. EPA identification numbers and to contract with registered hazardous waste transporters to transfer hazardous waste to appropriate Class I disposal facilities. (Cal. Code Regs., tit. 22, § 66262.10 et seq.)

Non hazardous wastes are degradable or inert materials, which do not contain concentrations of soluble pollutants that could degrade water quality and are therefore eligible for disposal at Class II or Class III disposal facilities. (Cal. Code Regs., tit. 14, § 17200 et seq.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Existing Site Conditions

The certification process requires a Phase I Environmental Site Assessment (ESA) to identify any potential or existing releases of hazardous substances or contamination at the project site and any areas known to be contaminated on or near the site.

The Applicant submitted an ESA, dated August 2007, in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 for ESAs. (Ex. 300, p. 6.13-7.) The ESA shows that no recognized environmental conditions (RECs) were identified at the project site or linear facility corridors.[2]

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[1] California Health and Safety Code, section 25100 et seq. (hazardous Control Waste Control Act of 1972, as amended) and Title 22, California Code of Regulations, Section 66261.1 et seq.

[2] A REC is considered to be the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicated an existing release, past

Staff nonetheless recommended, and we have adopted, Conditions of Certification **WASTE-1** and **WASTE-2** to mitigate any previously unrecognized conditions that may be encountered during construction and operation. These Conditions require a registered professional geologist or professional engineer with experience in remedial investigation and feasibility, to be available for consultation during soil excavation and grading. Under these Conditions, if potentially contaminated soil is identified during these activities, then the engineer or geologist shall prepare required reports and work with appropriate agencies for necessary remediation.

2. Construction Impacts and Mitigation

Site preparation and construction of the power plant and its associated facilities will generate both nonhazardous and hazardous wastes. The amount of waste generated during project construction would be minor with implementation of source reduction and recycling.

The nonhazardous solid wastes are expected to include approximately 280 tons of scrap wood, concrete, steel/metal, paper, glass, and plastics. These wastes will be recycled to the extent possible. Non-recyclable wastes will be collected and disposed of pursuant to applicable LORS.

Nonhazardous liquid wastes are expected to include sanitary wastes and dust suppression, drainage, and equipment washwater. Sanitary wastes will be collected in portable, self-contained toilets and pumped periodically for disposal at an appropriate facility. Potentially contaminated equipment washwater will be contained at designated wash areas and transported to a sanitary wastewater treatment facility. The **SOIL AND WATER RESOURCES** section of this Decision more fully discusses management of project wastewater. (Ex. 300, p. 6.13-8.)

Hazardous wastes generated during construction will include empty hazardous material containers from solvents, waste paint, and adhesives, oil absorbents, used oils, oily rags; and varying amounts of batteries, and waste oil filters.

The hazardous wastes will be accumulated onsite no longer than 90 days and then properly manifested, transported to, and disposed at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. The disposal methods described in the evidentiary record indicate

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release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or in the ground, groundwater, or surface water of the property.

that wastes will be handled in accordance with all applicable LORS. (Exs. 1, p. 5.14-8, 300, p. 6.13-8 to 6.13-9.)

Conditions of Certification **WASTE-1, WASTE-2, WASTE-3, WASTE-4**, and **WASTE-5** address the possible encounter of contaminated soils during construction, grading, or trenching and the specific handling, disposal, and other precautions that might be required by hazardous materials LORS. Conditions **WASTE-1** and **WASTE-2**, discussed above, mitigate any previously unrecognized conditions that may be encountered during construction and operation. Condition **WASTE-3** requires the project owner to develop and implement a Construction Waste Management Plan before construction begins, to ensure that waste will be recycled when possible and properly disposed of at a landfill when necessary. Condition **WASTE-4** requires the project owner to obtain a hazardous waste generator identification number from the U.S. Environmental Protection Agency before generating any hazardous wastes during project construction and operation. Condition **WASTE-5** requires the project owner to notify BLM and the Energy Commission's Compliance Project Manager (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.

3. Operation Impacts and Mitigation

ISEGS will generate nonhazardous and hazardous wastes under normal operating conditions. The amount of waste generated during project construction would be minor with implementation of source reduction and recycling.

Operation is expected to generate 240 tons per year of nonhazardous solid wastes. These wastes will include routine maintenance wastes (such as used air filters, spent deionization resins, sand and filter media) and domestic and office wastes (such as office paper, newsprint, aluminum cans, plastic, and glass). All nonhazardous wastes will be recycled to the extent feasible, and non-recyclable wastes will be regularly transported offsite to a local solid waste disposal facility in accordance with applicable LORS. Management of nonhazardous liquid wastes generated during project operation is discussed in the **SOIL AND WATER RESOURCES** section of this Decision.

Routine operations are expected to generate approximately four tons of hazardous waste, including hydraulic fluids, oils, greases, oily filters and rags, cleaning solutions and solvents, and batteries. Although spills might occur,

proper hazardous material handling and good practices will keep spill wastes to a minimum.

Hazardous wastes will be temporarily stored onsite no longer than 90 days and transported by licensed hazardous waste haulers to authorized disposal facilities in accordance with LORS applicable to generators of hazardous waste. (Ex. 300, p. 6.13-9 to 6.13-10.)

Conditions of Certification **WASTE-4, WASTE-5, WASTE-6,** and **WASTE-7** will address any potential impacts associated with operational generation of wastes.

As discussed above, Condition **WASTE-4** requires the project owner to obtain a hazardous waste generator identification number from the U.S. Environmental Protection Agency and Condition **WASTE-5** requires the project owner to notify BLM and 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. Condition **WASTE-6** requires the project owner to develop and implement an Operation Waste Management Plan to identify all waste streams and the methods of managing each waste. To ensure proper cleanup and management of contamination due to unauthorized releases of hazardous materials or hazardous wastes, Condition **WASTE-7** requires the project owner to report, clean up, and remediate as necessary, any hazardous materials spills or releases in accordance with applicable law. The **HAZARDOUS MATERIAL MANAGEMENT** section of this Decision more fully discusses plan provisions for hazardous material management, spill reporting, containment, spill control and countermeasures.

4. Potential Impacts on Waste Disposal Facilities

During project construction, approximately 280 tons of solid waste will be generated and recycled or disposed of in a Class III landfill. The total amount of nonhazardous waste generated from the project is estimated to be less than 300 cubic yards of solid waste from construction and approximately 250 cubic yard per year from operation. Four tons of hazardous waste from ISEGS would require off-site disposal.

The following three waste disposal facilities that could take the ISEGS nonhazardous construction and operation wastes: Sloan Transfer facility in Sloan, Nevada; Apex Regional Landfill in Las Vegas, Nevada; and Barstow Sanitary Landfill in Barstow, California. The evidence shows that there is

sufficient capacity at these facilities to handle the project's construction and operation nonhazardous wastes.

Hazardous wastes will be transported to one of two available Class I landfills: 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. Evidence indicates there is sufficient capacity at these facilities to handle the project's hazardous wastes during its operating lifetime. (Ex. 300, p. 6.13-11.)

3. Cumulative Impacts and Mitigation

The evidence shows that there is potential for substantial future development in the Ivanpah Valley area and throughout the southern California desert region. As a result, the quantities of solid and hazardous wastes generated by the project will add to the total quantities of waste generated by new local and regional residential and commercial development. However, the evidence further shows that because the project's waste stream is relatively low, recycling efforts will be prioritized, and sufficient disposal capacity is available, the project's cumulative impacts on disposal facilities will be insignificant for both nonhazardous and hazardous waste disposal. (Ex. 300, pp. 6.13-12 to 6.13-14.)

4. Agency and Public Comment

The County of San Bernardino's Solid Waste Management Division is responsible for the management and oversight of all county landfill and waste transfer operations. In an October 3, 2007 letter, the County identified the administrative procedures with which ISEGS must comply to build and operate its project. In a subsequent letter dated January 5, 2009, the County found that Staff's environmental analysis of the proposed project was adequate and incorporated the appropriate local, state, and federal LORS.

The organization Basin and Range Watch submitted a letter dated January 31, 2009, asking about the safety procedures pertaining to contamination caused by the spilling of heavy metal waste. Staff addressed this inquiry by recommending – and we have adopted - Conditions of Certification **WASTE- 1** through **WASTE-7** to protect both workers and the environment against hazardous material spills. The **Public Health** and **Hazardous Materials Management** sections of this Decision also provide additional Conditions to mitigate any potential impacts due to spills.

FINDINGS OF FACT

Based on the uncontroverted evidence, the Commission makes the following findings:

1. Applicant's Phase I Environmental Site Assessment (ESA) for the site did not identify any recognized environmental conditions (RECs).

2. The project will generate nonhazardous and hazardous wastes during excavation, construction, and operation.

3. The project owner will implement appropriate characterization, disposal, and remediation measures to ensure that the risk of exposure to contaminated soils at the site or along the linear corridors is reduced to insignificant levels.

4. The project will recycle nonhazardous and hazardous wastes to the extent feasible and in compliance with applicable law.

5. Hazardous wastes that cannot be recycled will be transported by registered hazardous waste transporters to appropriate Class I landfills.

6. Solid nonhazardous wastes that cannot be recycled will be deposited at Class II and III landfills in the local area.

7. Liquid wastes will be classified for appropriate disposal and managed in accordance with the Conditions of Certification listed in the **SOIL AND WATER RESOURCES** section of this Decision.

8. Disposal of project wastes will not result in any significant direct, indirect, or cumulative impacts on existing waste disposal facilities.

CONCLUSIONS OF LAW

1. Implementation of the Conditions of Certification, below, and the waste management practices described in the evidentiary record will reduce potential impacts to insignificant levels and ensure that project wastes are handled in an environmentally safe manner.

2. The management of project wastes will comply with all applicable laws, ordinances, regulations, and standards related to waste management as identified in the pertinent portions of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of an experienced and qualified professional engineer or professional geologist, who shall be available for consultation during site characterization (if needed), demolition, excavation, and grading activities, to BLM's Authorized Officer, and the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The professional engineer or professional geologist shall be given authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil and impact public health, safety and the environment.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the resume to BLM's Authorized Officer and the CPM for review and approval.

WASTE-2 If potentially contaminated soil is identified during site characterization, demolition, excavation, or grading at either the proposed site or linear facilities, as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the professional engineer or professional geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and provide a written report to the project owner, representatives of Department of Toxic Substances Control or Regional Water Quality Control Board, BLM's Authorized Officer, and the CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the professional engineer or professional geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the professional engineer or professional geologist, significant remediation may be required, the project owner shall contact BLM's Authorized Officer and the CPM and representatives of the Department of Toxic Substances Control for or the Regional Water Quality control Board, for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the professional engineer or professional geologist to BLM's Authorized Officer and the CPM within five days of their receipt. The project owner shall notify BLM's Authorized Officer and the CPM within 24 hours of any orders issued to halt construction.

WASTE-3 The project owner shall prepare a Construction Waste Management Plan for all wastes generated during construction of the facility and shall submit the plan to BLM's Authorized Officer, and the CPM for

review and approval. The plan shall contain, at a minimum, the following:

- a description of all construction waste streams, including projections of frequency, amounts generated, and hazard classifications; and
- management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans.

Verification: The project owner shall submit the Construction Waste Management Plan to BLM's Authorized Officer, and the CPM for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-4 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency prior to generating any hazardous waste during project construction and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide documentation of the hazardous waste generation notification and receipt of the number to BLM's Authorized Officer and the CPM in the next scheduled Monthly Compliance Report after receipt of the number. Submittal of the notification and issued number documentation to BLM's Authorized Officer, and the CPM is only needed once unless there is a change in ownership, operation, waste generation, or waste characteristics that requires a new notification to USEPA. Documentation of any new or revised hazardous waste generation notifications or changes in identification number shall be provided to BLM's Authorized Officer, and the CPM in the next scheduled compliance report.

WASTE-5 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify BLM's Authorized Officer, and the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify BLM's Authorized Officer and the CPM in writing within 10 days of becoming aware of an impending enforcement action. BLM's Authorized Officer and the CPM shall notify the project owner of any changes that will be required in the way project-related wastes are managed.

WASTE-6 The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the facility and shall

submit the plan to BLM's Authorized Officer, and the CPM for review and approval. The plan shall contain, at a minimum, the following:

- a detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- information and summary records of conversations with the local Certified Unified Program Agency and the Department of Toxic Substances Control regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary;
- a detailed description of how facility wastes will be managed and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and
- a detailed description of how facility wastes will be managed and disposed upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to BLM's Authorized Officer, and the CPM for approval no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions to BLM's Authorized Officer, and the CPM within 20 days of notification from BLM's Authorized Officer. and the CPM that revisions are necessary.

The project owner shall also document in each Annual Compliance Report the actual volume of wastes generated and the waste management methods used during the year; provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan; and update the Operation Waste Management Plan as necessary to address current waste generation and management practices.

WASTE-7 The project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous waste are reported, cleaned up, and remediated as necessary, in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document all unauthorized releases and spills of hazardous substances, materials, or wastes that occur on the project

property or related pipeline and transmission corridors. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; amount of contaminated soil/material generated; how release was managed and material cleaned up; if the release was reported; to whom the release was reported; release corrective action and cleanup requirements placed by regulating agencies; level of cleanup achieved and actions taken to prevent a similar release or spill; and disposition of any hazardous wastes and/or contaminated soils and materials that may have been generated by the release. Copies of the unauthorized spill documentation shall be provided to BLM's Authorized Officer and the CPM within 30 days of the date the release was discovered.

VI. ENVIRONMENTAL ASSESSMENT

A. BIOLOGICAL RESOURCES

The Commission must consider the potential impacts of project-related activities on biological resources, including state and federally listed species, species of special concern, wetlands, and other resources of critical biological interest such as unique habitats. The evidence describes the biological resources in the vicinity of the project site and linear alignments, assesses the potential for adverse impacts, proposes mitigation measures to reduce those impacts and assesses the project's compliance with applicable laws, ordinances, regulations, and standards (LORS).

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Project Description

The ISEGS project is located in Southern California's Mojave Desert, approximately 3 miles southwest of the Nevada border, to the west of Ivanpah Dry Lake, on federal (public) land managed by the BLM. It is situated on a bajada (alluvial fan with many washes) that extends eastward from the surrounding Clark Mountains to Ivanpah Dry Lake. The Primm Valley Golf Club is immediately east of the proposed project area. Primm, Nevada is the nearest town, located just over the state line and approximately 4.5 miles east along Interstate 15 (I-15), which lies east of the project site, approximately 0.8 mile at its closest point. Immediately west and less than 3 miles south of the project are units of the Mojave National Preserve. Approximately 4.5 miles and 15 miles northeast along I-15 are a retail/casino center with residential facilities and the town of Jean, respectively. The outskirts of greater Las Vegas lie approximately 32 miles to the north-northeast. Access to site is from the Yates Well Road Interchange on Interstate 15 (I-15) via Colosseum Road. (See **Project Description Figure 1**.) The proposed project would cause permanent or temporary disturbance of about 3,582 acres (5.6 square miles) of federal land managed by BLM. The Applicant has modified the project to exclude 433 acres formally included in Ivanpah 3 and reduce the amount of disturbed lands by another 109 acres in the Construction Logistics Area. (Ex. 300, pp. 6.2-7 – 6.2-8; Ex. 315, pp. 2-3, 4-3.)

2. Biological Setting

The ISEGS site is located on and surrounded by undisturbed, natural land, with the exception of the Primm Valley Golf Club and I-15 to the east and a transmission line and associated unpaved roads. Vegetation on the site and in the immediate project area consists of primarily Mojave creosote bush scrub, with Mojave yucca – Nevada ephedra scrub, and Mojave wash scrub also represented. Plant communities at the site are characterized by an unusually high diversity and density of native succulents and relatively low levels of noxious weeds. Elevations in the project area range from approximately 3,150 to 2,850 feet above mean sea level (BSE 2007a). The Clark Mountain Range occurs to the north and west of the project area, and the topography slopes gradually down to the east and southeast toward Ivanpah Dry Lake on the alluvial fans and bajada on the Clark Mountains' east and south flanks. Approximately 2,000 ephemeral washes, which form part of the regional bajada, occur throughout the project area. The northernmost phase of the project site is immediately flanked by two hills: a limestone hill to the west and a metamorphic hill to the east.

The dominant plant community on the site, Mojave creosote bush scrub, is common in the Mojave Desert and is comprised of drought-adapted native shrubs. A census of all individuals of California barrel cactus (Ferocactus cylindraceus var. lecontei) and clustered barrel cactus (Echinocactus polycephalus var. polycephalus) recorded 2,869 individuals of California barrel cactus and 3,501 individuals of clustered barrel cactus within the project area. Densities were estimated at one to two mature barrel cacti per acre for the site overall. Densities of 15 mature barrel cacti per acre were found in some localized areas. This density is unusual because it occurs on a bajada rather than on rocky slopes where high barrel cactus densities would be expected.

Annual plants are also characteristic of Mojave creosote bush scrub but were notably absent during the Applicant's initial field surveys in 2007 due to low rainfall. Follow-up field surveys were conducted in 2008 to characterize annual plant cover. In the project area, creosote bush (Larrea tridentata) is dominant in Mojave creosote bush scrub, and the following are commonly associated perennial species: burrobush (Ambrosia dumosa), clustered barrel cactus, Nevada ephedra (Ephedra nevadensis), California barrel cactus, cheesebush (Hymenoclea salsola), and Mojave yucca (Yucca shidigera). Additional plant communities and habitats within the project footprint include Mojave wash scrub and numerous ephemeral washes also that occur on the site. Additional

vegetation types within a one-mile radius of the project footprint include Mojave yucca – Nevada ephedra scrub and limestone pavement plain.

The project area known as Ivanpah 1 (913.5 acres), the southernmost site, consists almost entirely of the Larrea-Ambrosia subtype of creosote bush scrub and occurs mainly in a form characterized by a low density and diversity of shrubs and cacti and a very low density of Mojave yucca. Here, the dominant shrubs of the larrea-ambrosia subtype are mainly less than 3 feet in height, with many less than 1 foot in height, and relatively widely spaced. Creosote bush and burrobush are the most common shrubs, with cheesebush, pima ratany (Krameria erecta), Nevada ephedra, Mojave Desert California buckwheat (Eriogonum fasciculatum ssp. polifolium), silver cholla (Opuntia echinocarpa), buckhorn cholla (Opuntia acanthocarpa var. coloradensis), beavertail cactus (Opuntia basilaris var. basilaris), and pencil cholla (Opuntia ramosissima) all present in much lower abundance. Barrel cacti of both species (i.e., California barrel cactus and clustered barrel cactus) and Mojave yucca are present in low to very low numbers. The topography of the Ivanpah 1 site is relatively flat, although it is broken by a number of small to medium-sized ephemeral washes dominated by cheesebush.

Vegetation of the Ivanpah 2 project area (1097 acres) consists predominantly of the larrea-ambrosia subtype of Mojave creosote bush scrub. This vegetation subtype varies in shrub and cactus density and species diversity from areas that are moderate in density and diversity at the upper elevation west end to areas that are low in density and diversity at the lower elevation east end. Creosote bush and burrobush are the dominant shrubs and are typically 1 to 4 feet in height. Associated species include: cheesebush, pima ratany, Nevada ephedra, Mojave Desert California buckwheat, silver cholla, buckhorn cholla, beavertail cactus, and pencil cactus. The density of barrel cacti, including California barrel cactus and clustered barrel cactus, and Mojave yucca, is highest in the northern third of the site, moderately high in the western half of the site, and lowest in the southern half, especially to the east.

The topography is relatively flat overall and dissected by many small to medium-sized ephemeral washes with active channels usually less than 5 feet wide that flow from west to east in the northern half of Ivanpah 2 and trend from southwest to northeast and east in the southern half of Ivanpah 2. The vegetation of most of these is composed mainly of shrub species typical of larrea-ambrosia scrub. Cheesebush washes are in higher densities than in adjacent areas. North of Colosseum Road, in the southern half of Ivanpah 2, is a large drainage complex

up to 75 feet wide in some areas, although the active channels are much narrower. This large wash system supports Mojave wash scrub, although in a form distinguished mainly by the presence of catclaw acacia (Acacia greggii). This form has lower shrub species diversity than the Mojave wash scrub observed in Ivanpah 3.

The project area known as Ivanpah 3 (1,227 acres) is the northernmost and largest of the three proposed sites and supports more complex plant communities than Ivanpah 1 and 2. The larrea-ambrosia scrub subtype of Mojave creosote bush scrub is the most common vegetation type and occurs throughout Ivanpah 3, covering about 75 to 80 percent of the site. The larrea mixed scrub subtype of Mojave creosote bush scrub occurs north and south of the limestone hill, along the southwest margin, and also immediately adjacent to the northern boundary of Ivanpah 3. In the western and northern parts of Ivanpah 3, larrea mixed scrub patches alternate with patches of larrea-ambrosia scrub. Some of the larger drainage features, which are concentrated in the northern and western sections of Ivanpah 3, contain well-developed Mojave wash scrub. Within Ivanpah 3, the larrea-ambrosia scrub subtype varies from the low density-low diversity form to the high density-high diversity form. The patterns are complex but, in general, vegetation with lower densities and diversity of shrubs and cacti, and lower densities of Mojave yucca, is more widespread in the southeastern section of Ivanpah 3.

The elevation gradient within Ivanpah 3 trends very gradually downward from approximately 3,400 feet at the western margin to about 2,985 feet at the southeastern corner. The topography of Ivanpah 3 is more strongly undulating than that of Ivanpah 1 and 2 due to the presence of many small to large ephemeral wash drainage features that trend generally in a west-to-east direction. Mojave wash scrub is well-developed in some of the larger ephemeral wash drainage features in the northern and western sections of Ivanpah 3. These drainage features are typically 30 to 75 feet wide bank-to-bank, although the active channels occupy only a small portion of the entire feature.

Mojave wash scrub within Ivanpah 3 varies in density and diversity of shrubs. The dominant shrubs are drought-deciduous and are typically 3 to 10 feet in height. The best-developed stands include many large individuals of catclaw acacia, some scattered large desert-willow (Chilopsis linearis), and a variety of wash-associated smaller shrubs, including: cheesebush, desert almond (Prunus fasciculata), black-banded rabbitbrush (Chrysothamnus paniculatus), bladder

sage (Salazaria mexicana), Cooper's boxthorn (Lycium cooperi), and Anderson's boxthorn (Lycium andersonii).

Noxious weeds were relatively low in abundance and diversity throughout the ISEGS project area. Eight weed species of weed were detected during the 2007/2008 floristic surveys:

- Sahara mustard, or African mustard, (Brassica tournefortii)
- Red brome (Bromus madritensis ssp. rubens)
- Cheat grass (Bromus tectorum)
- Mediterranean grass (Schismus spp.)
- Russian thistle (Salsola sp.)
- London rocket (Sisymbrium irio)
- Mediterranean tamarisk or saltcedar (Tamarix ramosissima)
- Filaree or storksbill (Erodium cicutarium)

(Ex. 300, p. 6.2.9 – 6.2-13.)

The diverse plant communities and landscape features in and around the ISEGS site support a correspondingly high diversity of wildlife. Reptiles detected during 2007 and 2008 surveys include desert tortoise (Gopherus agassizii), side-blotched lizard (Uta stansburiana), desert iguana (Dipsosaurus dorsalis), long-nosed leopard lizard (Gambelia wislizenii), western whiptail (Cnemidophorus tigris), zebra-tailed lizard (Callisaurus draconoides), common collared lizard (Crotaphytus collaris), and sidewinder (Crotalus cerastes). The banded Gila monster (Heloderma suspectum cinctum) was not detected during the surveys, but this large, seldom-seen lizard may occur in the project vicinity.

The project area is likely to attract a variety of mammal species such as Audubon's cottontail (Sylvilagus audubonii), black-tailed jackrabbit (Lepus californicus), whitetail antelope squirrel (Ammospermophilus leucurus), desert kit fox (Vulpes macrotis), and coyote (Canis latrans). Given the proximity of the Clark Mountains, it is likely that mule deer (Odocoileus hemionus hemionus) and desert bighorn sheep (Ovis canadensis nelsoni) move down into the upper elevations of the valley, including the ISEGS project area, to forage. It is also likely that portions of Ivanpah Valley provide movement corridors for that bighorn sheep subspecies and for mule deer.

In addition, the ISEGS project area provides forage, cover, roosting, and nesting habitat for a variety of bird species. Resident and migratory birds occur at the ISEGS site during the winter, migratory, and breeding seasons, including Say's

phoebe (Sayornis saya), black-throated sparrow (Amphispiza bilineata), white-crowned sparrow (Zonotrichia leucophrys), sage sparrow (Amphispiza belli), blue-gray gnatcatcher (Polioptila caerulea), cactus wren (Campylorhynchus brunneicapillus), verdin (Auriparus flaviceps), western kingbird (Tyrannus verticalis), sage thrasher (Oreoscoptes montanus), house finch (Carpodacus mexicanus), lesser nighthawk (Chordeiles acutipennis), common ground-dove (Columbina passerina), mourning dove (Zenaida macroura), Gambel's quail (Callipepla gambelii), American kestrel (Falco sparverius), burrowing owl (Athene cunicularia), and red-tailed hawk (Buteo jamaicensis). (Ex. 300, p. 6.2-15.)

3. Special-Status Species

Biological Resources Table 1, below, lists special-status species that are known to occur or which could potentially occur in the project vicinity. Many of these special-status plants and animals are unlikely to occur at the ISEGS site due to lack of suitable habitat. However, quite a few were detected during the 2007/2008 surveys or otherwise known to occur at or near the site; they are indicated by **bold-face type**.

Biological Resources Table 1
Special-Status Species Known or Potentially Occurring in the ISEGS Project Area and Vicinity

PLANTS		
Common Name	***Scientific Name***	**Status State/Fed/CNPS/BLM**
Mormon needle grass	*Achnatherum aridum*	__/__/2.3
Clark Mountain agave*	***Agave utahensis* var. *nevadensis***	**__/__/4.2**
Desert ageratina	*Ageratina herbacea*	__/__/2.3
Coyote gilia	*Aliciella triodon*	__/__/2.2
Small-flowered androstephium	***Androstephium breviflorum***	**__/__/2.2**
White bear poppy	*Arctomecon merriamii*	__/__/2.2
Mojave milkweed	***Asclepias nyctaginifolia***	**__/__/2.1**
Cima milk-vetch	*Astragalus cimae* var. *cimae*	__/__/1B.2/S
Providence Mountain milk-vetch	*Astragalus nutans*	__/__/4.2
Scaly cloak fern	*Astrolepis cochisensis* ssp. *cochisensis*	__/__/2.3
Black grama	*Bouteloua eriopoda*	__/__/4.2
Red grama	*Bouteloua trifida*	__/__/2.3
Alkali mariposa lily	*Calochortus striatus*	__/__/1B.2/S
Purple bird's-beak	*Cordylanthus parviflorus*	__/__/2.3
Desert pincushion	***Coryphantha chlorantha***	**__/__/2.1**
Viviparous foxtail cactus*	***Coryphantha vivipara* var. *rosea***	**__/__/2.2**
Winged cryptantha	*Cryptantha holoptera*	__/__/4.3
Gilman's cymopterus	*Cymopterus gilmanii*	__/__/2.3
Utah vine milkweed	***Cynanchum utahense***	**__/__/4.2**
Nine-awned pappus grass	***Enneapogon desvauxii***	**__/__/2.2**
Naked-stemmed daisy	*Enceliopsis nudicaulis* ssp. *nudicaulis*	__/__/4.3
Limestone daisy	*Erigeron uncialis* var. *uncialis*	__/__/1B.2/S
Forked buckwheat	*Eriogonum bifurcatum*	__/__/1B.2/S
Hairy erioneuron	*Erioneuron pilosum*	__/__/2.3
Clark Mountain spurge	*Euphorbia exstipulata* var. *exstipulata*	__/__/2.1
Wright's bedstraw	*Galium wrightii*	__/__/2.3
Pungent glossopetalon	*Glossopetalon pungens*	__/__/1B.2/S
Parish club-cholla	***Grusonia parishii***	**__/__/2.2**
Hairy-podded fine-leaf hymenopappus	*Hymenopappus filifolius* var. *eriopodus*	__/__/2.3
Jaeger's ivesia	*Ivesia jaegeri*	__/__/1B.3/S
Knotted rush	*Juncus nodosus*	__/__/2.3
Hillside wheat grass	*Leymus salinus* ssp. *mojavensis*	__/__/2.3
Plains flax	*Linum puberulum*	__/__/2.3
Spearleaf	*Matelea parvifolia*	__/__/2.3
Rough menodora	*Menodora scabra*	__/__/2.3
Polished blazing star	*Mentzelia polita*	__/__/1B.2/S
Utah mortonia*	***Mortonia utahensis***	**__/__/4.3**
Tough muhly	*Muhlenbergia arsenei*	__/__/2.3

PLANTS		
Common Name	***Scientific Name***	**Status State/Fed/CNPS/BLM**
Crowned muilla	*Muilla coronata*	__/__/4.2
False buffalo-grass	*Munroa squarrosa*	__/__/2.2
Cave evening-primrose*	***Oenothera cavernae***	**__/__/2.1**
Short-joint beavertail	*Opuntia basilaris* var. *brachyclada*	__/__/1B.2
Curved-spine beavertail	*Opuntia curvospina*	__/__/2.2
Spiny cliff-brake	*Pellaea truncata*	__/__/2.3
White-margined beardtongue	*Penstemon albomarginatus*	__/__/1B.2
Rosy two-toned beardtongue	*Penstemon bicolor* ssp. *roseus*	__/__/2.3
Limestone beardtongue	*Penstemon calcareous*	__/__/1B.3
Death Valley beardtongue	*Penstemon fruticiformis* var. *amargosae*	__/__/1B.3
Stephen's beardtongue	*Penstemon stephensii*	__/__/1B.3
Thompson's beardtongue	*Penstemon thompsoniae*	__/__/2.3
Utah beardtongue	*Penstemon utahensis*	__/__/2.3
Aven Nelson's phacelia	*Phacelia anelsonii*	__/__/2.3
Barneby's phacelia	*Phacelia barnebyana*	__/__/2.3
Sky-blue phacelia	*Phacelia coerulea*	__/__/2.3
Parish's phacelia	*Phacelia parishii*	__/__/1B.1/S
Jaeger's phacelia	*Phacelia perityloides* var. *jaegeri*	__/__/1B.3/S
Chambers' physaria	*Physaria chambersii*	__/__/2.3
Small-flowered rice grass	*Piptatherum micranthum*	__/__/2.3
Desert portulaca	***Portulaca halimoides***	**__/__/4.3**
Abert's sanvitalia	*Sanvitalia abertii*	__/__/2.2
Many-flowered schkuhria	*Schkuhria multiflora* var. *multiflora*	__/__/2.3
Johnson's bee-hive cactus	*Sclerocactus johnsonii*	__/__/2.2
Mojave spike-moss	*Selaginella leucobryoides*	__/__/4.3
Rusby's desert-mallow	***Sphaeralcea rusbyi* var. *eremicola***	**__/__/1B.2/S**
WILDLIFE		
Common Name	***Scientific Name***	**Status State/Fed/BLM**
Reptiles		
Desert tortoise	***Gopherus agassizii***	**ST/FT/__**
Banded gila monster	*Heloderma suspectum cinctum*	CSC/__/__/S
Birds		
Burrowing owl	***Athene cunicularia***	**CSC/FSC/__**
Golden eagle	***Aquila chrysaetos***	**CSC, FP/FSC/S**
Vaux's swift	***Chaetura vauxi***	**__/FSC/__**
Gray-headed junco	*Junco hyemalis caniceps*	WL/FSC/__
Loggerhead shrike	***Lanius ludovicianus***	**CSC/FSC/__**
Hepatic tanager	*Piranga flava*	WL/FSC/__
Summer tanager	*Piranga rubra*	CSC/__/__

PLANTS		
Common Name	***Scientific Name***	**Status State/Fed/CNPS/BLM**
Brewer's sparrow	***Spizella breweri***	**__/BCC/__**
Bendire's thrasher	*Toxostoma bendirei*	CSC/BCC/S
Crissal thrasher	***Toxostoma crissale***	**CSC/BCC/__**
Le Conte's thrasher	***Toxostoma lecontei***	**WL/BSS/__**
Virginia's warbler	*Vermivora virginiae*	WL/BCC/__
Gray vireo	*Vireo vicinior*	CSC/BCC/S
Mammals		
Townsend's big-eared bat	*Corynorhinus townsendii*	CSC/__/S
Pallid bat	*Antrozous pallidus*	CSC/__/S
Long-legged myotis	*Myotis volans*	__/__/S
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	__/__/S
American badger	***Taxidea taxus***	**CSC/__/__**

Bold-face-type species names are those observed on or near the proposed project site or plants observed in the one-mile buffer by the applicant during the 2007/08 field surveys.

* Found in buffer area surveys only. For all but Utah mortonia; no specific location information was included in the applicant's final botanical plant report (CH2M Hill 2008x).

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.
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): S = 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>

(Ex. 300, pp. 6.2-16 – 6.2-18.)

a. Plants

Many special-status plant species were found in the ISEGS project area, vicinity, and buffer areas during botanical surveys. No state or federally listed plant species occur within the ISEGS project area, but eight plant species listed by the

California Native Plant Society (CNPS) are known to occur on the site or in the immediate vicinity.

Information on the natural history, distribution, and status of these species on the project area is provided below. In addition to the floristic surveys conducted by the Applicant, Commission staff searched databases and files of the CDFG's California Natural Diversity Database (CNDDB), NatureServe (an international network of natural heritage programs), CNPS, and the Consortium of California Herbaria (2008) data, including information not yet entered into the CNDDB and CNPS databases. Four special-status plants (Clark Mountain agave, viviparous foxtail cactus, Utah mortonia, and cave evening-primrose) are not discussed in detail below because they were found outside the project footprint during buffer area surveys, would not be impacted by the project, and locations were not included for most of these plants in the applicant's final botanical report.

Small-Flowered Androstephium (Androstephium breviflorum). Small-flowered androstephium is a bulbiferous herb found mainly in San Bernardino County, though it has been recorded in adjacent Riverside County and possibly Inyo County. This species also occurs in Arizona, Nevada, and Utah. It is found in dry, loose sandy to rocky soils, and on sand dunes and alluvial fans. The CNDDB Element Occurrence records are all presumed extant. In addition, approximately 31 occurrences were documented in the AFC for the Stirling Energy Systems Solar One Project (now called Calico Solar). In 2008 a total of 12 individuals were mapped in four locations on the ISEGS project site, within Ivanpah 1 and 2, in Mojave creosote bush scrub. Many new occurrences of this species have been found in recent years and the project area includes only a very small portion of its total distribution in California.

Mojave Milkweed (Asclepias nyctaginifolia). The California distribution of Mojave milkweed is limited to a very small area in eastern San Bernardino County. Currently, it is known from less than 25 occurrences, 16 of which occur in Ivanpah Valley in the project area. Its distribution outside of Ivanpah Valley is limited to a few very old historic collections and only two other populations that have been confirmed extant. This perennial plant also occurs in Arizona, New Mexico, and Nevada but it has a CNDDB state rank of S1 (critically imperiled and vulnerable to extirpation from the state due to extreme rarity). The habitat of Mojave milkweed in California includes washes and dry slopes from about 3,000 to 5,100 feet in Mojavean desert scrub and pinyon and juniper woodland. In 2008, 202 individuals of Mojave milkweed were mapped in 59 locations mainly in small washes in Ivanpah 1, 2, and 3. Within the project area, Mojave milkweed

typically grows in small- to medium-sized washes with sandy to gravelly substrates.

Desert Pincushion (Coryphantha chlorantha). Desert pincushion is a stem succulent found in the Mojave Desert in San Bernardino and Inyo counties, and also occurs in Arizona, Nevada, and Utah. CNDDB currently lists fewer than 25 documented occurrences in California, approximately one-third of which occur in the project area. It has a CNDDB global rank of G2 (imperiled and at high risk of extinction due to a very restricted global range) and a CNDDB state rank of S1 (critically imperiled). In California its habitat is gravelly or rocky carbonate substrates. Desert pincushion's distribution in California is apparently restricted to a few mountain ranges in the eastern Mojave Desert, in eastern San Bernardino County and southeastern Inyo County. Desert pincushion is widely scattered throughout the project area. In 2008, 477 individuals of this species were mapped in 177 locations during protocol-level surveys; within Ivanpah 1, 2, and 3; the construction logistics area; and the utility corridor. In 2007, an additional 122 individuals were found in 114 locations. The combined total for 2007 and 2008 is 599 individuals in 291 locations. Most individuals were found in Mojave creosote bush scrub.

Utah Vine Milkweed (Cynanchum utahense). Utah vine milkweed is a perennial herb found in the Mojave Desert in San Bernardino County and in the Colorado Desert in Riverside, Imperial, and San Diego Counties. This species also occurs in Arizona, Nevada, and Utah. In California its habitat is sandy and gravelly soils, often in washes climbing up through shrubs. The CNDDB electronic files do not track CNPS List 4 species, but staff found two Element Occurrences in the CNDDB paper files. Herbarium records noted approximately 42 additional occurrences. In 2008, 991 individuals were found in 146 locations, mainly in Ivanpah 1 and 2. In 2007, three individuals were mapped in three locations, all within Ivanpah 1. Most individuals were found in small washes in Mojave creosote bush scrub. The total for 2007 and 2008 on the Ivanpah Project site is 994 individuals in 149 locations.

Nine-Awned Pappus Grass (Enneapogon desvauxii). Nine-awned pappus grass is a widespread species of the southwestern U.S., Mexico and South America, but the California range of this species is restricted to a small portion of eastern Mojave Desert, in San Bernardino County. It has a CNDDB state rank of S2 (imperiled). It is currently known from fewer than 25 documented occurrences. Habitat of nine-awned pappus grass in California consists of rocky slopes, crevices, calcareous soils, in desert woodland. In the Ivanpah Valley, this

species occurs on the often north-facing sides of medium-sized to large washes, and on cobble mounds within and outside of washes that include some calcareous rocks, from 2,900 to 3,400 feet, in Mojave creosote bush scrub. In 2007, no individuals of this species were detected within the ISEGS project area, but in the 2008 surveys 8,145 plants were documented, suggesting that the population varies widely in response to seasonal variation in precipitation and other climate variables.

Parish's Club-Cholla (Grusonia parishii). The California range of Parish's club-cholla has a CNDDB state rank of S2 (imperiled). Currently, it is known from fewer than 20 occurrences but it has a wider range in California that extends south into Riverside County. Nearly 30 percent of the documented occurrences to date occur within the project area. This stem succulent also occurs in Nevada, Arizona, and possibly Texas. The habitat of Parish's club-cholla within the project area consists of sandy to somewhat gravelly uplands in the larrea-ambrosia sub-type of Mojave creosote bush scrub. Parish's club-cholla is abundant within the ISEGS project area, where it is discontinuously distributed, with most locations found in Ivanpah 1 and 3, and the construction logistics area. This species grows in clones consisting of spreading mats that may form separate patches over time. One 'mat' (dense, clonal clumps) was defined as one individual during the 2007-2008 surveys. In 2008, 196 clumps or mats of Parish's club-cholla were mapped at 47 locations within Ivanpah 1, the construction logistics area, and the utility corridor. In 2007, 143 were mapped within 96 locations in Ivanpah 1 and 3, and the construction logistics area. For 2008 and 2007 combined, 339 individuals were mapped in 143 locations.

Desert portulaca (Portulaca halimoides). Desert portulaca is a late summer/early fall blooming annual found in Riverside and San Bernardino Counties, and possibly San Diego County. This species also occurs in Nevada, Arizona, Utah, Colorado, New Mexico, Oklahoma, Texas, and Baja California. Its habitat consists of sandy washes and flats, from about 3,000 to 3,600 feet in elevation. Herbarium records noted 16 different occurrences, not including the one collected from the project site.

Desert portulaca was observed within the ISEGS project area in October 2007, following rains that August. Quantitative data on the distribution and abundance of desert portulaca within the ISEGS project area are not available, but one individual was detected at the site. The plant's location in the project area was not mapped in the Applicant's final botanical report.

Rusby's Desert-Mallow (Sphaeralcea rusbyi var. eremicola). Rusby's desert-mallow is a California endemic perennial herb; it is documented globally from less than 30 occurrences in Inyo and San Bernardino Counties in the Death Valley Region and Eastern Mojave Desert in the Clark Mountain Range. It has a CNDDB state rank of S2 (imperiled). It occurs in the Clark Mountain Range at Ivanpah Springs, on desert slopes and gravelly sandy washes and often in carbonate and limestone substrate, extending into the project area. This plant is the only BLM-sensitive plant species detected on site. This species was not detected during the 2007 surveys, but in 2008 15 individuals were mapped in 12 locations in Mojave creosote bush scrub within Ivanpah 1, 2, and 3, the construction logistics area, and the utility corridor. (Ex. 300, pp. 6.2-18 – 6.2-21.)

b. Birds

Western Burrowing Owl (Athene cunicularia hypugaea). Western burrowing owls inhabit arid lands throughout much of the western United States and southern interior of western Canada. In the Mojave Desert region, and in many other areas, this species has declined because of habitat modification, poisoning of its prey, and introduced nest predators. The burrowing owl is diurnal and usually non-migratory in this portion of its range.

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, San Joaquin 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. The southern California breeding season (from pair bonding to fledging) generally occurs from February to August with peak breeding activity from April through July.

In the Mojave Desert, burrowing owls generally occur at low densities in scattered populations, but they can be found in much higher densities near agricultural lands where rodent and insect prey tend to be more abundant. 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.), are also important food items. Other prey animals include reptiles and amphibians, young cottontail rabbits, bats, and birds, such as sparrows and horned larks. Consumption of insects increases during the breeding season. (Ex. 300, p. 6.2-22.)

This species was detected on the ISEGS site during the 2008 surveys but not in 2007. Suitable habitat was identified. No owls, feathers, active burrows, pellets or whitewash were observed. The size and status of burrowing owl population at the project site is not known. The ISEGS site provides suitable foraging and breeding habitat for this species.

Golden Eagle (Aquila chrysaetos). Throughout most of the western United States golden eagles are mostly year-round residents, breeding from late January through August with peak activity in March through July. 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.

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. This species prefers to nest in rugged, open habitats with canyons and escarpments, with overhanging ledges and cliffs and large trees used as cover. Golden eagles were detected on the ISEGS project site, but are unlikely to nest there because of the absence of suitable nesting habitat. However, the Clark Mountains, just north of the project area, provide suitable nesting habitat for this species, and the ISEGS site provides foraging habitat.

Loggerhead Shrike (Lanius ludovicianus). Loggerhead shrikes 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). In the Mojave Desert this species appears to be most numerous in flat or gently sloping deserts and desert/scrub edges, especially along the eastern slopes of mountainous areas. 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. (Ex. 300, p. 6.2-23.)

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. Loggerhead shrikes were detected on the ISEGS site and are year-round residents, using the site for nesting, foraging, and cover.

Le Conte's Thrasher (Toxostoma lecontei). This species inhabits some of the hottest and driest habitats in the arid southwest, including the Mojave Desert where they occur year-round. Preferred habitats include sparse desert scrub, alkali desert scrub, and desert succulent scrub habitats with open desert washes. They seek gentle to rolling slopes bisected by dry desert washes, conditions found on alluvial fans that are found in the project area. The Le Conte's thrasher population densities are among the lowest of passerine (perching) birds, estimated at less than five birds per square kilometer in optimal habitat. This low population density decreases the probability of their detection during field surveys. This species requires areas with an accumulated leaf litter under most plants as cover for its preferred arthropod prey; they also feed on seeds, insects, small lizards, and other small vertebrates. LeConte's thrashers were detected during the surveys. They are year-round residents at the ISEGS site and use the site for nesting, foraging, and cover. (*Id.*)

Crissal Thrasher (Toxostoma crissale). Crissal thrashers are non-migratory residents ranging from southern Nevada and southeastern California to western Texas and central Mexico, and they are known to occur in the Mojave Desert in the vicinity of the Clark Mountains. This species prefers habitats characterized by dense, low scrubby vegetation, such as desert and foothill scrub and riparian brush including higher elevation arroyos of the Mojave Desert, normally near the upper limit of desert scrub vegetation as it transitions into pinyon-juniper woodland. The nest of this species typically consists of an open cup of twigs, lined with finer vegetation, and placed in the middle of a dense shrub. Loss of habitat to clearing for agriculture or urban and suburban development threatens some populations. Crissal thrashers were detected during the surveys and are likely to be year-round residents at the ISEGS site, using the site for nesting, foraging, and cover. (*Id.*)

Vaux's Swift (Chaetura vauxi). Most Vaux's swifts observed in the Mojave Desert are passing through, and this species is not known to breed in San Bernardino County or elsewhere in the Mojave Desert. 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 not found in the project area. This species was detected in the project area, but was likely a migrant rather than a resident. The ISEGS project area does not provide nesting habitat for Vaux's swift.

Brewer's Sparrow (Spizella breweri). Brewer's Sparrow is a fairly common summer resident and breeder east of the Cascade-Sierra Nevada crest in mountains and higher valleys of the Mojave Desert. In summer, Brewer's sparrow often finds cover in sagebrush in extensive stands with moderate canopy unbroken by trees, while similar shrub habitats, such as bitterbrush, are used to a lesser extent. This species breeds in treeless shrub habitats with moderate canopy, especially in sagebrush. In winter, this species is common in open desert scrub and cropland habitats of the southern Mojave and Colorado deserts, usually in areas with some herbaceous understory. Brewer's sparrows were detected during the surveys and are likely to be year-round residents at the ISEGS site, using the site for nesting, foraging, and cover. (Ex. 300, pp. 6.2-22 – 6.2-24.)

c. Mammals

American Badger (Taxidea taxus). American badgers were once fairly widespread throughout open grassland habitats of California. They are now uncommon, permanent residents throughout most of the state, with the exception of the northern North Coast area. Known to occur in the Mojave Desert, they are most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Badgers are generally associated with treeless regions, prairies, parklands, and cold desert areas. Cultivated lands have been reported to provide little usable habitat for this species. They feed mainly on small mammals, especially ground squirrels, pocket gophers, rats, mice, and chipmunks. This species captures some of its prey above ground foraging on birds, eggs, reptiles, invertebrates, and carrion. Its diet will shift seasonally and yearly depending upon prey availability. This species is somewhat tolerant of human activities. The ISEGS project site provides suitable foraging habitat and denning sites for American badger, and it was detected during the 2007 surveys.

Nelson's Bighorn Sheep (Ovis canadensis nelsoni). The Nelson's bighorn sheep includes bighorns from the Transverse Ranges through most of the desert mountain ranges of California and adjacent Nevada and northern Arizona to

Utah. This species is widely distributed from the White Mountains in Mono County south to the Chocolate Mountains in Imperial County, and is known to occur in the Clark Mountains. 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.

Bighorn sheep graze on grasses and browse shrubs, particularly in fall and winter, and seek minerals at natural salt licks. In the spring, when annual plants are available, bighorn tend to disperse downhill to bajadas and alluvial fans to forage. Bighorn sheep have a large rumen, relative to body size, which allows digestion of grasses, even in a dry state. This gives them flexibility to select diets that optimize nutrient content from available forage. Consequently, bighorn sheep feed on a large variety of plant species and diet composition varies seasonally and among locations. While diet quality in the Mojave Desert varies greatly among years, it is most predictably high in late winter and spring, and this period coincides with the peak of lambing. 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.

Radio telemetry studies of bighorn sheep in various southwestern deserts, including the Mojave Desert of California, have found considerable movement of these sheep between mountain ranges. Consequently, intermountain areas of the desert floor that bighorn traverse between mountain ranges can be as important to the long-term viability of populations as are the mountain ranges themselves (Schwartz et al. 1986, Bleich et al. 1990).

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, and 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. It is common for males and females to segregate and occupy different habitats outside the breeding season. Females tend to choose particularly steep, safe areas for bearing and initial rearing of lambs. Males frequently occupy much less precipitous habitat during the lamb-rearing season.
The CNDDB records indicate that this species was documented in the vicinity of the ISEGS project in 1986, when approximately 150 sheep were recorded approximately 2.9 miles west and northwest of the project area in the Clark Mountains. Jaeger’s 1994 studies of bighorn sheep in the Kingston and Clark

Mountain ranges provide some more recent information on the demography, habitat use, behavior and movement patterns of the Clark Mountain population of Nelson's bighorn sheep. 58 ewes were estimated in the Clark Mountain population in 1991 and 1992, with an ewe to ram ratio of approximately 96:100. From 1991 through 1993 the ewe population in the Clark Mountain Range declined due to poor recruitment of lambs combined with mountain lion predation on adults. Radio-collared ewes in the Clark Mountain Range moved seasonally between Clark Mountain and the State Line Hills, a part of the Spring Range in Nevada, to the northeast (Jaeger 1994). Bighorn also utilized the Mesquite Range, which lies to the northwest of the Clark Mountains.

No studies are available that would confirm the presence of Nelson's bighorn sheep in the project area. Given the proximity of the Clark Mountains, it is likely that bighorn sheep move down into the upper elevations of the Ivanpah Valley, including the ISEGS project area, to forage (CH2M Hill 2008 p. 3-7). Alluvial fans near steep rocky terrain can provide crucial foraging habitat for big horn sheep. The Ivanpah Valley may also provide important movement corridors for deer and bighorn sheep. CDFG has noted that wildlife corridors are present through and adjacent to the ISEGS site, and have expressed concern that the project could adversely affect bighorn sheep. However, no studies are available documenting bighorn use of the Ivanpah Valley as a migratory area. (Ex. 300, pp. 6.2-24 – 6.2-26.)

Bats. Pallid bat (Antrozous pallidus) and Townsend's big-eared bat (Corynorhinus townsendii) are special-status bat species that have been reported in the project vicinity. The pallid bat is a locally common species of low elevations in California, occurring throughout the state from Shasta to Kern counties except in the high Sierra. It occupies a wide variety of habitats, including grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. The species is most common in open, dry habitats with rocky areas for roosting and is a yearlong resident in most of the range. Pallid bats use caves, crevices, and mines for day roosts.

Townsend's big-eared bat is found throughout California in all but subalpine and alpine habitats, and may be found at any season throughout its range. Once considered common, Townsend's big-eared bat now is considered uncommon in California. It is most abundant in mesic habitats, and uses caves, mines, tunnels, buildings, or other human made structures for roosting. The Townsend's big-eared bat captures its prey in flight using echolocation, or by gleaning from foliage, with small moths being its principal prey. Extremely sensitive to

disturbance of roosting sites, a single disturbance may result in the abandonment of a maternity roost.

Pallid and Townsend's big-eared bats could use the project area for foraging and might use nearby mine shafts for roosting. Though no mines exist on the project site, Staff observed a mine shaft in the limestone hill immediately west of Ivanpah 3. While BLM staff conducted a visual night survey on June 23, 2008, at least five bats were observed from the limestone hill, and one individual flew into and out of the mine shaft. Species identification was not possible with this type of survey. Although standard acoustic surveys would be able to distinguish most species, they would successfully detect Townsend's big-eared bat. (Ex. 300, pp. 6.2-26 – 6.2-27.)

d. Reptiles

Banded Gila Monster (Heloderma suspectum cinctum). The banded Gila monster is considered rare in California with only 26 credible records of the species within the past 153 years. This large and distinct looking lizard is difficult to observe even in areas where they have been recently recorded. As a result, little is known about this species' distribution, population status, and life history in California.

Most of the historical observations in California occurred in mountainous areas of moderate elevations with rocky, incised topography, in large and relatively high ranges as well as riparian areas. Despite the widespread localities of potential habitat throughout the California desert, the few documented observations suggest the California populations appear to be confined to the eastern portion of the California desert, and the current distribution is apparently a function of summer rainfall. Throughout their range, Gila monsters appear to be most active during or following summer rain events. Gila monsters have been recorded in the adjacent Mojave National Preserve and the Clark Mountains. The closest confirmed observation of a Gila monster to the project area is likely an animal collected within the Mojave National Preserve in 1962 on the eastern slope of the Clark Mountains near Ivanpah Springs. Another incidental observation from the area includes finding Gila monster remains beneath a red-tail hawk nest near Primm, Nevada.

Like most areas of the desert, rain fall within the Ivanpah Valley is variable but mean annual precipitation is approximately 4 to 7 inches. The distribution of rainfall is also bi-modal with winter peak precipitation typically in February and

summer peak rain falls in August. Runoff from the steep surrounding mountains is rapid and flash floods are common events as most of the storm water in the Ivanpah Valley drains across the alluvial fan to Ivanpah and Roach Dry Lakes. Although the Mojave is the driest of the North American deserts, the east Mojave does receive a large percentage of its annual precipitation from summer "monsoon" rains. The relative abundance of cacti, many yuccas, agaves, and agave-like plants tend to be greater where warm-season rainfall is abundant. This is true of the ISEGS project area where cacti are extremely abundant. Although the project area does not receive near the amount of the rainfall as the Sonoran Desert where Gila monsters are more prevalent, the Ivanpah Valley does mimic the climatic conditions that appear to be favorable to Gila monster presence.

Gila monsters have the potential to occur in the ISEGS project area, particularly near the metamorphic hill, immediately adjacent to the southeastern boundary of Ivanpah 3. They could also occur at the northeastern corner of Ivanpah 2 as well as the utility interconnections south of the base of the Clark Mountains. Gila monsters may venture from those rockier areas adjacent to the project area where they would likely take refuge in small crevices and caves to forage within the spreading arroyo on which the proposed project is located.

Desert Tortoise. The desert tortoise's range includes the Mojave Desert region of Nevada, southern California, and the southwest corner of Utah and the Sonoran Desert region of Arizona and northern Mexico. The range is divided into Mojave and Sonoran populations. The Ivanpah Valley supports the Mojave population, which is primarily found in creosote bush-dominated valleys with adequate annual forbs for forage.

Desert tortoises have been known to live up to 70 years or more but the typical adult likely lives 25 to 35 years. Like many long-lived species, the tortoise has a relatively slow rate of reproduction, and achieves breeding status at 15 to 20 years of age. Egg-laying occurs primarily from April to July; the eggs typically hatch 90 to 120 days later, between August and October.

Desert tortoise activity is seasonally variable, and in California peak adult and juvenile activity typically coincides with the greatest annual forage availability during the early spring and summer. However, tortoises will emerge from their burrows at any time of year when the weather is suitable. Hatchling desert tortoises typically become active earlier than adults do and their greatest activity period can be expected between late winter and spring. During active periods,

tortoises feed on a wide variety of herbaceous plants, including cactus, grasses, and annual flowers.

Annual home ranges have been estimated between 10 and 450 acres and are age, sex, seasonal, and resource density dependent. Although adult males can be aggressive toward each other during the breeding season, there can be a great deal of overlap in individual home ranges. More than 1.5 square miles of habitat may be required to meet the life history needs of a tortoise and individuals have been known to travel as much or more than 7 miles at a time. In drought years, tortoises can be expected to wander farther in search of forage. During their active period, desert tortoises retreat to shallow burrows and aboveground shade to escape the heat of the day, and will also retire to burrows at nighttime. Desert tortoises are primarily dormant in winter in underground burrows and sometimes congregate in communal dens.

Desert tortoise populations have declined throughout their range because of loss and degradation of habitat caused by urbanization, agricultural development, military training, recreational use, mining, and livestock grazing. Increased predation by common ravens, collection by humans for pets or consumption, collisions with vehicles on paved and unpaved roads, and mortality resulting from diseases also contributed to declines.

The ISEGS project area provides high quality habitat for this species, with low levels of disturbance and high plant species diversity. The desert tortoise population in this part of the Ivanpah Valley is also unique because it is the highest elevation at which this species is known to reside in the state. The 2007/2008 protocol desert tortoise surveys found 25 live desert tortoises, 97 desert tortoise carcasses, 214 burrows, and 50 other tortoise sign. Tortoise sign and density was greatest in Ivanpah 1 at the southern boundary of the project site and was less dense as the survey moved towards the Clark Mountains and Ivanpah 3.

Desert tortoises also occur along the ISEGS linear facilities. Surveys of the fiber optic route confirmed that the entire route is within desert tortoise habitat. Protocol level surveys were not conducted. However, in surveying for the fiber optic route, EPG, Inc. found three tortoise burrows and a tortoise shell. (Ex. 300, pp. 6.2-27 – 6.2-29.)

Desert Tortoise Recovery Plan. The desert tortoise recovery plan recommends implementation of reserve level protection of desert tortoise populations and

habitat within Desert Wildlife Management Areas (DWMAs), while maintaining and protecting other sensitive species and ecosystem functions. Critical habitat was designated to identify areas containing key biological and physical attributes that are essential to the desert tortoise's survival and conservation, such as space, food, water, nutrition, cover, shelter, and reproductive sites. As part of the actions needed to accomplish the recovery of this species, land management goals within all DWMAs include restriction of human activities that adversely affect desert tortoises. The ISEGS project does not fall within any DWMA (EX. 300, p. 6.2-75).

The USFWS 1994 and Draft 2008 Desert Tortoise Recovery Plans (USFWS 1994, 2008), emphasize aggressive management within "tortoise conservation areas" a term that encompasses critical habitat Desert Wildlife Management Areas, Areas of Critical Environmental Concern, and other conservation areas or easements managed for desert tortoises. While the recovery plans suggest that land managers focus the most aggressive recovery efforts toward tortoise conservation areas, they also emphasize that land managers should strive to limit the loss of desert tortoise habitat outside conservation areas as much as possible. The recovery plans recognize that activities occurring on lands beyond the boundaries of existing tortoise conservation areas can affect tortoise populations and the effectiveness of conservation actions occurring within the conservation area boundaries. While recovery efforts may be prioritized within existing desert tortoise conservation areas, populations, habitats, and actions outside of these areas may also contribute to, or hamper, recovery of the species. (Ex. 300, pp. 6.2-29 – 6.2-30.)

4. Direct and Indirect Impacts and Mitigation

Potentially significant impacts to biological resources would occur if special-status species, such as state- or federal-listed species, state fully protected species, candidates for state or federal listing and/or Species of Special Concern, are likely to be impacted from the construction and/or operation of the proposed project. Interruption of species migration; reduction of native fish, wildlife and plant habitat; causing a fish or wildlife population to drop below self-sustaining levels; and disturbance of wetlands, marshes, riparian areas or other wildlife habitat would also be considered potentially significant impacts. Harassment of a protected species, even if it does not result in the loss of habitat or reduction in population numbers, could also be considered a significant impact, as could substantial degradation of the quality of the environment or environmental effects that are individually limited, but cumulatively considerable.

Direct impacts as those impacts that result from the project and occur at the same time and place. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance while still reasonably foreseeable and related to the project.

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 Mojave Desert ecosystem the definition of permanent impacts needs to reflect the slow recovery rates of its plant communities. For example, creosote bushes can resprout a full canopy within five years after damage from heavy vehicle traffic, but more severe damage involving vegetation removal and soil disturbance can take from 50 to 300 years; complete ecosystem recovery may require over 3,000 years. (Ex. 300, p. 6.2-31.) In our analysis, an impact is considered temporary only if pre-disturbance levels of biomass, cover, density, community structure, and soil characteristics could be achieved within five years.

a. Plant Communities

The revised ISEGS project adopts a Low Impact Development (LID) approach and the Applicant intends to minimize the disturbance of native vegetation during construction and operations. Clearing and grubbing, where shrubs and roots are removed, would be performed for permanent access roads in each of the three ISEGS units, in the power blocks, and in common areas where the existing topography requires modification to provide access for installation equipment and materials during construction.

Outside of access roads and maintenance tracks, vegetation would be cut to and maintained at 12-18 inches to provide clearance for heliostat functions, but would leave the root structures intact. The evidence is uncertain about the effects of this mowing. The results of a study conducted on 35 plants at the project site indicate that mowed plants will initially respond by re-sprouting from the base, but the long-term response is less certain. Mowing is likely to promote the proliferation of non-native invasive weeds, in particular cheat grass and red brome, two species of particular concern at the project site. Suppressing the surrounding taller native vegetation would give those lower-growing weeds a competitive edge. The native perennial shrubs would be weakened and diminished in size, utilizing less moisture and nutrients, and increasing sunlight available to the weeds. (Ex. 300, p. 6.2-33.)

Cheat grass, red brome, 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 non-native annual grasses such as these has dramatically increased the fuel load and frequency of fire in many desert ecosystems. 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. Burned creosote and other native shrubs are typically replaced by short-lived perennials and non-native grasses.

Vegetation that is not directly impacted by clearing or pruning would be indirectly impacted by shading. Shading from heliostats would reduce the amount of sunlight available for photosynthesis, eliminating longer wavelengths of the visible light spectrum. This would likely have the most dramatic affect on crassulacean acid metabolism (CAM) plants, desert-adapted plants like Mohave yucca, barrel cactus, and cholla. Pollinators that have a mutualistic relationship with CAM plants, like yucca and yucca moths, would also be affected. Habitat fragmentation would also adversely affect pollinator activity and therefore potentially affect gene flow among the plants that remain. Shading would reduce transpiration due to reduced photosynthetic rates, increasing soil moisture, and resulting in changes to soil nutrient availability and microbial communities.

Other indirect effects on plant communities during operation include soil compaction, changes to the soil structure by use of dust suppressants, and changes in the distribution of rain falling on the solar fields. During precipitation events heliostats would be placed in the flat horizontal position. Runoff would concentrate along the drip-line below the heliostats rather than being uniformly distributed, changing the soil water content. Mirror wash water would similarly concentrate along the drip line below the heliostats, causing minor erosion of the soil at the drip line and promoting growth of weeds. (Ex. 300, p. 6.2-34.)

Of the eight special-status plants potentially affected by the project, two—Utah vine milkweed, and desert portulaca—are ranked as “watch list” by CNPS and CDFG’s CNDDB and as such generally considered more regionally common than plants on higher priority lists. Due to their relative abundance and the small number of the plants found on the project site, impacts to those species are not significant. (Ex. 300, p. 6.2-35, Ex. 315, pp. 4-4 – 4-5.)

A substantial portion of the Ivanpah Valley documented occurrences of small-flowered androstephium, Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow would be directly, indirectly, and cumulatively impacted by the project. Plants are particularly vulnerable to the effects of habitat fragmentation; small fragments of habitat can only support small populations and are more vulnerable to extinction. Even minor fluctuations in climate can be catastrophic in a small fragmented population. For small-flowered androstephium, Mojave milkweed, desert pincushion, nine-awned pappus grass, and Parish's club-cholla, the California populations are already geographically marginal relative to their core populations outside the state. For most of these species, these Ivanpah Valley populations represent a substantial portion of their total documented range regionally and within California. Loss of a substantial portion of these populations makes them more vulnerable to extirpation within the state, especially for Mojave milkweed; its California distribution outside of the Ivanpah Valley is restricted to only two other observations and a handful of historic herbarium collections. **Biological Resources Table 2** summarizes the percentage of statewide documented occurrences for these special-status plant species. (Ex. 300, pp. 4-4 – 4-6.)

Biological Resources Table 2
Percentage of Statewide Documented Element Occurrences[1] for Special-Status Plant Species in the ISEGS Project

Name Scientific (Common)	CDFG's CNDDB Rank Global/State and CNPS List	Total Documented Occurrences in CNDDB* (including project occurrences)	Additional Occurrences from Consortium of California Herbaria**	Occurrences From Other Available Data (other projects)***	Project Site Occurrences (as reported by CNDDB 2/2010)	Project Site % of Documented Occurrences in California (List 2 plants) or Globally (List 1B)
Androstephium breviflorum (**small-flowered androstephium**)	G5 S1.2, List 2.2	82	0	1	3	3/(82+1) = 4%
Asclepias nyctaginifolia (**Mojave milkweed**)	G4G5 S1, List 2.1	22	1	1	11	11/(22+1+1) = 46%
Coryphantha	G2G3 S1,	22	1	n/a	5	5/(22+1) = 22%

[1] The term "Element Occurrence (EO)" refers to populations or groups of individuals occurring in close proximity to each other, and is defined by the CNDDB as individuals of a particular species occurring within one-quarter mile of each other. When numerous localities are documented by a reporter within very close proximity of each other, CNDDB uses this standardized and nationally accepted mapping convention, which allows a common metric for comparison, using a quarter-mile grid. Data provided to CNDDB by the applicant (CH2M Hill 2008c, Table 5-1) were mapped by CNDDB using this convention into the number of EOs shown in the column "Project Site Occurrences as reported by CNDDB 2/2010." These numbers should not be confused with numbers of individual plants.

chlorantha **(desert pincushion)**	List 2.1					
Enneapogon desvauxii (**nine-awned pappus grass**)	G5 S2, List 2.2	21	0	1	3	3/(21+1) = 14%
Grusonia parishii (**Parish's club-cholla)**	G3G4 S2, List 2.2	16	0	1	2	2/(16+1) = 12%
Sphaeralcea rusbyi var. *eremicola* (**Rusby's desert-mallow**)	G4T2 S2, List 1B.2	29	4	n/a	4	4/(29+4) = 12%

* Number of CNDDB element occurrences February 2010_update)
** Number of occurrences derived from herbarium records, California Consortium of Herbaria
*** Number of occurrences derived from EA for the SCE El Dorado to Ivanpah 220 kV transmission line project

Global Rank is a reflection of the overall condition of an element throughout its global range:

G2—Imperiled	At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors;
G3—Vulnerable	At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors;
G4—Apparently Secure	Uncommon but not rare; some cause for long-term concern due to declines or other factors;
G5— Secure	Common; widespread and abundant.

Some of the G-ranks above are expressed as a range. Subspecies receive a T-rank attached to the G-rank. The G-rank refers to the whole species range, but the T-rank refers to the global condition of variety *eremicola* only.

State Rank:

S1— Critically Imperiled	Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province;
S2— Imperiled	Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province;
S3— Vulnerable	Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation;
? —	Indicates some uncertainty about the rank.

State Rank Extension:
0.2—threatened
(Ex. 315, pp. 4-7 – 4-9.)

To mitigate the potentially significant impacts to small-flowered androstephium, Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow, we impose Condition of Certification **BIO-13**, requiring a Weed Management Plan to help prevent the spread of non-native and invasive plant species on the ISEGS site.

Condition **BIO-14**, the Closure, Revegetation and Rehabilitation Plan, provides guidelines for minimizing impacts to project area plant communities, and for revegetating project area plant communities affected by construction.

Condition **BIO-11** requires impact avoidance and the use of best management practices.

Condition **BIO-18**, requires various measures, including careful routing of the gas pipeline to avoid areas with concentrations of the plants and preparation and implementation of a Special-Status Plant Protection and Monitoring Plan, and security to assure that implementation takes place.

Small-flowered androstephium, Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow are not listed under the California Endangered Species Act, but that does not diminish the potential significance of their loss. Plants on the CNPS List 1A, 1B, and 2 meet the definitions of Sections 2062 and 2067 (CESA) of the California Fish and Game Code, and are eligible for state listing. Furthermore, even if a species is not a California or federally listed species it still may be considered endangered, rare or threatened, if the species can be shown to meet the criteria in Section 15380 of the CEQA Guidelines. "CEQA Section 15380 provides that a plant or animal species may be treated as 'rare or endangered' even if not on one of the official lists if, for example, it is likely to become endangered in the foreseeable future." Plants appearing on CNPS List 1B or 2 are considered to meet that criteria, and impacts to these species are generally considered "significant." (Ex. 300, p. 6.2-38.)

Staff recommends that we find that the applicant's proposal to create protected habitat areas left free of project development and the application of the mitigation measures imposed by the Conditions of Certification reduces the potentially significant impacts to the six special-status species to less than significant levels. In doing so, however, staff admits to a "limited amount of uncertainty in this case regarding the on-site mitigation proposed for [two species (Mojave milkweed and desert pincushion)] located in the project area but outside protected areas designated in Mitigated Ivanpah 3." (Ex. 315, p. 4-6; 3/22/10 TR, pp. 170:15 – 173:13.) Due to this uncertainly and out of an abundance of caution, we find that the project may have a significant impact upon Mojave milkweed and desert pincushion due to the loss of a portion of their habitat.

b. Wildlife

American badgers were detected on the ISEGS site, and the site includes suitable foraging and denning habitat for this species. The American badger is protected under Title 14, California Code of Regulations (§§ 670.2 and 670.5),

and potential impacts to individuals of this species must be mitigated to less-than-significant levels. Construction of the ISEGS project could kill or injure American badgers by crushing with heavy equipment, or could entomb them within a den. Construction activities could also result in disturbance or harassment of individuals. Condition of Certification **BIO-11** requires that concurrent with the desert tortoise clearance survey, a qualified biologist perform a preconstruction survey for badger dens in the project area, including areas within 250 feet of all project facilities, utility corridors, and access roads. If badgers are detected within the fenced ISEGS project site during desert tortoise clearance surveys, the applicant must develop and implement a trapping and relocation plan in consultation with staff and CDFG. Condition of Certification **BIO-17**, the compensatory mitigation plan, could offset the loss of habitat for this species and reduces the impacts to less-than-significant levels. (Ex. 300, pp. 6.2-45 – 6.2-46.)

The project could reduce the availability of seasonal forage for Nelson's bighorn sheep. The ISEGS project boundaries and security fencing were shifted approximately 130 to 340 feet away from adjacent hills to provide a wildlife corridor. Even so, the project could also narrow the width of movement corridors between Clark Mountain and the Stateline Hills for this species. These direct and indirect impacts would contribute to the cumulative impacts to bighorn sheep in the eastern Mojave Desert. Loss of surface water sources may also diminish the viability of existing populations. (Ex. 300, pp. 6.2-46 – 6.2-47.)

We adopt Condition of Certification **BIO-19** to mitigate the project's contributions to cumulative impacts to bighorn sheep by creation of a new water source in the eastern part of the Clark Mountain range or in the State Line Hills outside of designated wilderness. This artificial water source would attract bighorn sheep and expand foraging opportunities in the lower elevations of the mountains to replace areas of the bajada lost to ISEGS facilities and the zone of disturbance on the north. This water source would also attract the bighorn during seasonal movements and keep them in the mountainous portion of the wildlife corridor.

Gila monsters were not detected during the 2007/2008 surveys, but this species is difficult to detect and its absence cannot be assumed. If Gila monsters are present in the ISEGS project area they may be harmed during clearing, grading and trenching activities or may become entrapped within open trenches and pipes. Construction activities could also result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Condition of Certification **BIO-11** requires that concurrent with the

desert tortoise clearance survey, a biologist perform a preconstruction survey for Gila monsters in the project area, and implement appropriate impact avoidance and minimization measures if detected. Condition **BIO-17**, the compensatory mitigation plan, will mitigate the loss of habitat for this species and reduce the impact to less-than-significant.

During construction of the ISEGS project desert tortoises may be harmed by clearing, grading, and trenching activities or may become entrapped within open trenches and pipes. Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises. Also, tortoises may take shelter under parked vehicles and be killed, injured, or harassed when the vehicle is moved.

The Applicant will implement impact avoidance and minimization measures to reduce these direct impacts to desert tortoise, including installation of exclusion fencing to keep desert tortoise out of construction areas, relocating/translocating the resident desert tortoise from the ISEGS site, reducing construction traffic and speed limits to reduce the incidence of road kills and worker training programs.

Conditions of Certification **BIO-1** through **BIO-6**, specify measures to protect desert tortoise and other biological resources in and near the ISEGS project area, and Conditions of Certification **BIO-8** through **BIO-11**, contain measures specific to desert tortoise, including exclusion fencing and the translocation of tortoise found inside the fence.

Implementation of staff's proposed Conditions of Certification **BIO-8** and **BIO-9** have inherent risks and could themselves result in direct effects such as mortality, injury, or harassment of desert tortoises due to equipment operation, fence installation activities, removal of tortoise burrows, and tortoise translocation. Installation of exclusionary fencing at the perimeter of the project area would also fragment habitat for desert tortoise and home ranges of individual tortoises. To address agency concerns about harm to tortoise resulting from translocation or the erection of the perimeter fence, Condition **BIO-9** requires the preparation of a Desert Tortoise Relocation/Translocation Plan in consultation with those agencies. (Ex. 300, pp. 6.2-47 – 6.2-51.)

The loss of approximately 3,582 acres of occupied habitat and fragmentation and disturbance to adjacent habitat will be compensated pursuant to Condition **BIO-17** by the acquisition of lands that would be permanently protected and enhanced to support healthy populations of desert tortoise. The acquired lands will be

permanent protected and managed for desert tortoise, and exclude incompatible uses such as grazing, off-highway vehicle use, roads and trails, utility corridors, military operations, construction, mining, grazing by livestock and burros, invasive species, fire, and environmental contaminants. An equally important component is the implementation of enhancement actions to improve desert tortoise survival and reproduction. These actions might include habitat restoration, weed control, road closures or road fencing, reducing livestock and burro grazing, and controlling ravens and other predators. Without permanent protection and enhancement actions on lands acquired for mitigation, the result would be a net loss for desert tortoise populations.

To adequately offset habitat loss CDFG usually requires a mitigation ratio greater than 1:1 for compensation lands (i.e., acquisition of one acre of compensation lands for every acre lost), and typically uses a 3:1 ratio for good quality habitat such as that found at the ISEGS project site. The higher ratio reflects the limits to increases in carrying capacity that can be achieved on the acquired lands, even with implementation of all possible protection and enhancement measures. Depending on the quality of the habitat that is lost and the habitat conditions of the land that is acquired, it is difficult to sufficiently increase the carrying capacity of the acquisition lands to completely offset habitat loss without relying on additional acreage to boost the numbers of desert tortoise that can be supported on the mitigation lands. The BLM applies a 1:1 compensation ratio because they pursue desert tortoise recovery goals not through parcel by parcel acquisitions and management, but rather through implementation of region-wide management plans and land use planning as described in the Northern and Eastern Mojave Coordinated Management Plan (NEMO), the California Desert Conservation Act plan, and the Desert Tortoise Recovery Plan.

Condition BIO-17 requires habitat compensation at a 3:1 ratio. This mitigation ratio is consistent with past Energy Commission mitigation requirements for projects with impacts to desert tortoise (for example, High Desert Power Plant Project and the Victorville 2 Hybrid Power Project), and with Incidental Take Permits issued by CDFG for other non-Energy Commission jurisdiction projects in the region. (Ex. 300, pp. 6.2-51 – 6.2-57.)

Human activities in the ISEGS project area potentially provide food or other attractants in the form of trash, litter, or water, which draw unnaturally high numbers of tortoise predators such as the common raven, kit fox, and coyote. Common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the

desert. 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.

In addition to ravens, 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 1994; Evans 2001). 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. The worker environmental awareness training (**BIO-6**) and restrictions on pets being brought to the site required of all personnel (**BIO-11**) would reduce or eliminate the potential for these impacts. Additional raven mitigation tools have been incorporated into Conditions **BIO-11** and **BIO-12**.

Vehicle traffic would increase as a result of construction and improvement of access roads, increasing the risk of injuring or killing desert tortoise. The applicant has proposed a variety of minimization measures which are into Condition of Certification **BIO-11**. These measures include confining vehicular traffic to and from the project site to existing routes of travel, prohibiting cross country vehicle and equipment use outside designated work areas, and imposing a speed limit of 20 miles per hour on Colosseum Road and other dirt access routes within desert tortoise habitat.

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. 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 erodibility of the soil and accelerates the loss of nutrients (Okin et al. 2001). Soil erosion from construction activities and vehicle activity, which affects vegetation and soil properties, could have an adverse effect on both tortoise foraging and burrowing potential to lands outside of the ISEGS boundaries. The impacts of increased dust and other construction impacts will be minimized with implementation of Condition of Certification **BIO-11**, and with Air Quality Conditions of Certification **AQ-SC3** and **AQ-SC-7** and Condition **Soil&Water-1** that would require selection and application of chemical dust suppressants that would not adversely affect vegetation. (Ex. 300, pp. 6.2-57 – 6.2-59.)

Noise from construction activities could temporarily discourage wildlife from foraging and nesting immediately adjacent to the project area. Many bird species rely on vocalization during the breeding season to attract a mate within their territory. Noise levels from certain construction, operations, and demolition activities could reduce the reproductive success of nesting birds. The expected loudest composite noise levels are approximately 89 dBA at 50 feet from the activity, which results in noise levels of approximately 77 and 61 dBA at distances of 200 and 400 feet from the activity, respectively. The construction period is relatively short, about 20 months per phase, and wildlife usually becomes habituated to ongoing general construction noise. Nearly all equipment would be specified to have near-field maximum noise levels that do not exceed 90 dBA at 3 feet from the activity to limit the noise exposure of plant personnel to acceptable levels. As a result of these design features, the temporary nature of these activities, and the adherence to noise reducing mitigation measures, the noise levels at the project fence line are not expected to have any substantial impact on nearby wildlife resources. (Ex. 300, p. 6.2-64.)

5. Cumulative Impacts

A project may result in a significant cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code Regs., tit. 14, § 15130). Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is “cumulatively considerable” [14 Cal. Code Regs., § 15130(a).] Such incremental effects are to be “viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects” [14 Cal. Code Regs., § 15164(b)(1).]

Biological Resources Tables 3 and 4, below, list the past and present projects and the foreseeable future projects, respectively, in the Ivanpah Valley.

Biological Resources Table 3
Past and Present Projects in the Ivanpah Valley

Map ID	Project Name/Ownership	Project Description
1	Bighorn Electric Generating Station/ Reliant Energy Wholesale Generation, LLC	Operating natural gas power plant, uses dry cooling system
2	Primm Casinos: Buffalo Bill's, Primm Valley, Whiskey Pete's/ Terrible's Primm Valley Casino Resorts (MGM Mirage)	Two existing Resort and Casinos and one existing Hotel and Casino; undergoing renovation
3	Primm Valley Golf Course/ Terrible's Primm Valley Casino Resorts (MGM Mirage)	Existing golf course located south of the California/Nevada border along I-15, opened in 1997.
4	Primm Outlet Mall/ Fashion Outlets (MGM Mirage)	Existing shopping outlet with over 100 stores. Connected to the Primm Casinos by monorail.
5	Recreation Activities/ BLM	Approximately 12 permitted and organized events (championship racing, archery, kite buggying, land sailing) occur on the Dry Lake annually; approximately 5000 annual visitors/year
6	Molycorp Minerals LLC	Existing mining operation on Mountain Pass, acquired by Molycorp in 1950 and mined ever since.
7	Colosseum Mine	Inactive mining facilities occupying 284 acres on a 3,316 acre private parcel.
8	Clark Mountain and Crescent Peak Allotment	Ongoing 10-year grazing lease
9	Molycorp Evaporation Pond/Chevron	Active evaporation pond southeast of Ivanpah Dry Lake
10	AT&T Fiber-optic replacement of cables	Existing direct buried fiber-optic cable replaced from Nevada border to the Halloran Summit within existing right-of-way; project complete.
11	Existing 115-kV transmission line from El Dorado substation/SCE	Existing line passing through ISEGS site
12	Molycorp (Now Chevron-Texaco) pipeline	Runs from Molycorp south of I-15, through the Mojave National Desert Preserve to the Evaporation Pond

(Ex. 300, pp. 5-13 – 5-14.)

Biological Resources Table 4
Future Foreseeable Projects in the Ivanpah Valley

Map ID	Project Name/Owner or Proponent	Project Description/Status
A	GEN 3 Solar, Inc/FirstSolar	A 300 MW photovoltaic development on 4,160 acres/Status: Plan of Development Letter sent 7/08
B	Ivanpah Airport (Southern Nevada Supplemental Airport)/Clark County Dept. of Aviation	The Ivanpah Valley Airport project is planned on 9.4 square miles (~6,000 acres) along I-15; Draft EIS in progress, possible construction start date of 2010, operation in 2017
C	Victorville-Las Vegas High Speed Train/ DesertXpress Enterprises	High speed train would run from Victorville to Las Vegas/Status: Scoping report completed 7/06; project proponents anticipate train operational by 2012. Proposed route is immediately northwest of the ISEGS site.

Map ID	Project Name/Owner or Proponent	Project Description/Status
D	Pipeline Restoration/ Mojave Pipeline	Pipeline restoration adjacent to ISEGS project, similar footprint to original pipeline/ Status: meetings in Jan/Feb 2008 to discuss right-of-way
E	Joint Port of Entry/Caltrans, CA Dept Food & Ag	Highway construction planned between Barstow and the Nevada state line includes: 1) a proposed point-of-entry inspection station near the Nevada border with construction likely to start in 2009 and continue for 2 years; 2) a 12-mile-long northbound truck descending lane and pavement rehabilitation (expected to be completed in the summer of 2010); and 3) regrading of median slopes, has been completed
F	Temporary Batch plant/Caltrans	Construction occurring now on widening of I-15
G	Mixed-use Development/ MGM Mirage and Jeanco Realty Development, LLC	166 acres proposed for housing, commercial businesses, new hotel-casino; includes demolition of two casinos MGM Mirage currently owns in Jean/ Status: On hold
H	Clark Mountain and Crescent Peak Allotment/ BLM	10 Year Lease grazing lease/Status: ongoing
I	Ivanpah Energy Center/ Diamond Generating Corporation	Status: On hold
J	Wind energy power plant/PPM Energy	75 MW wind energy project on 2,330 acres/Status: applications received 10/02, 10/06
K	Wind energy power plant/Clipper Wind CACA 44236	50 MW wind energy project on 3,360 acres/Status: applications received 3/02, 5/06
L	I-15 Mountain Pass Truck Lane/Caltrans	Now under construction from 8/08 to 2010
N	Upgrade to existing 115-kV transmission line from El Dorado Substation (SCE)	Construct a new Ivanpah Substation sized to accommodate 220 / 115 kV facilities, removal approximately 36 miles of a portion of existing line, construct a double circuit 220 kV line/Status: Project filing date early 2009, projected on line 2013
O	Mixed Use -Recreation	Approximately 200 Casual Use permits are issued annually (cover between 1 to 6 individuals); Status anticipate approximately 12 permitted and organized events per year l
P	Karnama Fast Food New fast food restaurant in Primm	Fast food restaurant to be built adjacent to the Primm Outlet Mall/Status: in permitting, application received 2/07
Q	Primm Solar Generating Plant/ NextLight Renewable Power, LLC	250 MW solar trough project on approximately 2,500 acres/ Status: application submitted to Las Vegas BLM Field Office
R	Cogentrix Solar Services, LLC.	Solar thermal energy facility for approximately 19,850 acres.

(Ex. 300, pp. 5-15 – 5-17.)

While no precise estimate can be made of the future habitat loss associated with the proposed projects listed above, collectively these projects would remove and fragment tens of thousands of acres of additional habitat. The ISEGS project, combined with the proposed 4,000-acre First Solar development immediately to the east, would eliminate a large swath of the better desert tortoise habitat found on the west side of I-15 within the Ivanpah Valley. All of these past, present, and future proposed activities contribute to the significant loss of Ivanpah Valley

vegetation communities, wildlife habitat, and special-status species. The 3,582-acre ISEGS would be a substantial contributor to the cumulative loss of Ivanpah Valley's native Mojave Desert plant and wildlife communities, including the threatened desert tortoise and other special-status species. With the exception of special-status plant species, this significant cumulative impact is reduced to less-than-significant levels with appropriate levels of compensatory mitigation, as required by Condition of Certification **BIO-17**.

6. LORS Compliance

The ISEGS must comply with state and federal laws, ordinances, regulations, and standards (LORS) that address state and federally listed species, as well as other sensitive species and habitats, and must secure the appropriate permits to satisfy these LORS.

a. State

The Energy Commission has a one-stop permitting process for all thermal power plants rated 50 MW or more under the Warren-Alquist Act (Pub. Res. Code § 25500). Under the act, the Energy Commission's certificate is "in lieu of" other state, local, and regional permits (*Ibid*.) The Commission's streamlined permitting process accomplishes a primary objective of the Renewable Energy Action Team, as identified in the Governor's Executive Order S-14-08 — to create a "one stop" process for permitting renewable energy generation facilities under California law. The adopted Conditions of Certification would satisfy the following state LORS and take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in the following state permits:

Incidental Take Permit: California Endangered Species Act (Fish and Game Code §§ 2050 et seq.) The California Endangered Species Act (CESA) prohibits the "take" (defined as "to hunt, pursue, catch, capture, or kill") of state-listed species except as otherwise provided in state law. Construction and operation of the ISEGS project could result in the take of desert tortoise, listed as threatened under CESA. Condition **BIO-17** specifies compensatory mitigation for desert tortoise habitat loss at a 3:1 ratio, with BLM "nesting" their 1:1 mitigation requirement within this framework. This funding and mitigation approach provides full mitigation for desert tortoise

Streambed Alteration Agreement, California Fish and Game Code §§ 1600 1607. Pursuant to these sections, CDFG typically regulates all changes to the

natural flow, bed, or bank, of any river, stream, or lake that supports fish or wildlife resources. Construction and operation of the ISEGS would result in direct or indirect impacts to up to 175 acres of waters of the state. Staff recommends Condition of Certification **BIO-19**, which we adopt, to assure compliance.

b. Federal

The ISEGS project is located on federal land under BLM's jurisdiction and is therefore subject to the provisions of BLM's California Desert Conservation Area (CDCA) Plan (Revised 1999). As an amendment to the CDCA Plan, BLM produced the Northern and Eastern Mojave (NEMO) Coordinated Management Plan (BLM 2002). This document consists of proposed management actions and alternatives for public lands in the NEMO Planning Area. The ISEGS project is located in the southeastern portion of the NEMO Planning Area Boundary.

The BLM has worked with the USFWS to develop a variety of land designations as tools to protect sensitive biological resources, including the desert tortoise. The siting of the ISEGS project considered the management direction of these designations, as described below:

- Desert Wildlife Management Areas (DWMA) are general areas recommended by the Desert Tortoise Recovery Plan (USFWS 1994) within which recovery efforts for the desert tortoise would be concentrated. DWMAs had no specific legal boundaries in the 1994 Recovery Plan. The BLM formalized the general DWMAs from the 1994 Recovery Plan through its planning process and administers them as Areas of Critical Environmental Concern (see below). The ISEGS project does not fall within any DWMA.

- Area of Critical Environmental Concern (ACEC) are specific, legally defined, BLM designations where special management is needed to protect and prevent irreparable damage to important historical, cultural, scenic values, fish and wildlife, and natural resources or to protect life and safety from natural hazards. The ISEGS project is not included within any designated ACEC.

- Critical Habitat consists of specific areas defined by the USFWS as areas essential for the conservation of the listed species, which support physical and biological features essential for survival and that may require special management considerations or protection. Critical habitat for the desert tortoise was designated in 1994, largely based on proposed DWMAs in the draft Recovery Plan. The ISEGS project is approximately 5 miles from the nearest desert tortoise critical habitat.

BLM provides management direction for species such as desert tortoise within the NEMO, which include five geographical areas of tortoise habitat in the planning area. These areas include an Ivanpah Valley and a North Ivanpah Valley area, with the ISEGS project located within the Ivanpah Valley habitat area. Current designations for both Ivanpah areas are as Category III desert tortoise habitat. Category III management goals are to limit tortoise habitat and population declines to the extent possible by mitigating impacts.

Potential take of the desert tortoise, listed as threatened by the USFWS, requires compliance with the federal Endangered Species Act (ESA) (16 USC §§ 1531 et seq.). "Take" of a federally-listed species is prohibited without an Incidental Take Permit, which would be obtained through a Section 7 consultation between BLM and the USFWS.

In order to construct and operate the ISEGS on BLM managed lands, the applicant has applied for a Right of Way Permit from BLM, which will address the project's compliance with federal law.

7. Public Comment

We find no comments which raise a substantial new environmental issue and require a specific response.

FINDINGS OF FACT

Based on the evidence, we find the following:

1. Construction and operation of ISEGS will disturb approximately 3,582 acres of previously undisturbed desert habitat.
2. Approximately 2,000 ephemeral washes, which form part of the regional bajada, occur throughout the project area.
3. The diverse plant communities and landscape features in and around the ISEGS site support a correspondingly high diversity of wildlife.
4. The ISEGS project area provides forage, cover, roosting, and nesting habitat for a variety of bird species.
5. Twenty-one special status wildlife and plant species were detected during biological surveys.
6. Implementation of Conditions of Certification **BIO-11**, **BIO-13**, **BIO-14**, and **BIO-18** will reduce impacts to Special-Status plant species. After mitigation, it

is uncertain whether potentially significant impacts to plants located on the project site but not in one of the protected areas will be mitigated to insignificant levels.

7. Implementation of Conditions of Certification **BIO-1** through **BIO-6**, **BIO-8** through **BIO-12**, **BIO-17**, **BIO-19** will reduce impacts to Special-Status plant species to insignificant levels, except as described immediately above.
8. A mitigation ratio of 3:1 is appropriate for the provision of habitat compensation lands for desert tortoise, Gila monster, big horn sheep, American badger, burrowing owl, golden eagle, Vaux's sift, loggerhead shrike, Brewer's sparrow, Crissal thrasher, and Le Conte's thrasher.
9. The effects of dust on wildlife and plants will be mitigated by the implementation of Conditions **BIO-11**, **AQ-SC3**, **AQ-SC-7** and **Soil&Water-1**.
10. Construction noise is not expected to have a substantial impact on nearby wildlife with the implementation of Conditions **NOISE-1** through **NOISE-7**.

CONCLUSIONS OF LAW

1. The project owner will implement appropriate avoidance and mitigation measures to prevent significant adverse impacts to all sensitive species with the possible exception of individual plants located on the project site but outside of protected areas.

2. With implementation of the mitigation measures described in the evidentiary record and incorporated into the Conditions of Certification below, as well as those in other portions of this Decision, the project will not result in significant direct, indirect, or cumulative impacts to biological resources except for a significant impact from the possible loss of individual special status plants (Mojave milkweed and desert pincushion) located on the project site but outside of protected areas. Our decision to override this and other significant impacts is described in the **Override Findings** section of this Decision.
3. With implementation of the mitigation measures described in the evidentiary record and incorporated into the Conditions of Certification, the ISEGS will conform to all applicable laws, ordinances, regulations, and standards related to biological resources as identified above and in the pertinent portion of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

Designated Biologist Selection and Qualifications[2]

BIO-1 The project owner shall assign at least one Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist(s), with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) and BLM's Authorized Officer for approval in consultation with CDFG and USFWS.

The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;

2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;

3. Have at least one year of field experience with biological resources found in or near the project area;

4. Meet the current USFWS Authorized Biologist qualifications criteria (USFWS 2008), demonstrate familiarity with protocols and guidelines for the desert tortoise, and be approved by the USFWS; and

5. Possess a California ESA Memorandum of Understanding pursuant to Section 2081(a) for desert tortoise.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of BLM's Authorized Officer and the CPM, in consultation with CDFG and USFWS, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: The project owner shall submit the specified information at least 90 days prior to the start of any project-related site disturbance activities. No site

[2] USFWS <www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt> designates biologists who are approved to handle tortoises as "Authorized Biologists." Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately, and have received USFWS approval. Authorized Biologists are permitted to then approve specific monitors to handle tortoises, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists, potentially including individual approvals for monitors approved by the Authorized Biologist. Designated Biologists are the equivalent of Authorized Biologists. Only Designated Biologists and certain Biological Monitors who have been approved by the Designated Biologist would be allowed to handle desert tortoises.

or related facility activities shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to BLM's Authorized Officer and the CPM at least 10 working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the BLM Authorized Officer and the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to BLM's Authorized Officer and the CPM and for consideration.

Designated Biologists shall complete a USFWS Qualifications Form (USFWS 2008) (www.fws.gov/ventura/speciesinfo/protocols_guidelines) and submit it to the USFWS, BLM's Authorized Officer and the CPM within 60 days prior to ground breaking for review and final approval.

Designated Biologist Duties

BIO-2 The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved Biological Monitor(s) but remains the contact for the project owner, BLM's Authorized Officer and the CPM. The Designated Biologist Duties shall include the following:

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification;

2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) to be submitted by the project owner;

3. Be available to supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species or their habitat;

4. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (e.g., parking lots) for animals in harm's way;

6. Notify the project owner and BLM's Authorized Officer and the CPM of any non-compliance with any biological resources condition of certification;

7. Respond directly to inquiries of BLM's Authorized Officer and the CPM regarding biological resource issues;

8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Compliance Report;

9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>, and; and

10. Maintain the ability to be in regular, direct communication with representatives of CDFG, USFWS, BLM's Authorized Officer and the CPM, including notifying these agencies of dead or injured listed species and reporting special-status species observations to the California Natural Diversity Data Base.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to BLM's Authorized Officer and the CPM and copies of all written reports and summaries that document biological resources compliance activities. If actions may affect biological resources during operation a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless his/her duties cease, as approved by BLM's Authorized Officer and the CPM.

Biological Monitor Selection And Qualifications

BIO-3 The project owner's BLM- and CPM-approved Designated Biologist shall submit the resume, at least three references, and contact information of the proposed Biological Monitors to BLM's Authorized Officer and the CPM. The resume shall demonstrate, to the satisfaction of the CPM the appropriate education and experience to accomplish the assigned biological resource tasks. The Biological Monitor is the equivalent of the USFWS designated Desert Tortoise Monitor (USFWS 2008).

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification, BRMIMP, WEAP, USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>.

Verification: The project owner shall submit the specified information to the BLM's Authorized Officer and the CPM for approval at least 30 days prior to the start of any project-related site disturbance activities. The Designated Biologist shall submit a written statement to BLM's Authorized Officer and the CPM confirming that individual Biological Monitor(s) has been trained including the date when training was completed. If additional biological monitors are needed during construction the specified information shall be submitted to BLM's Authorized Officer and the CPM and for approval at least 10 days prior to their first day of monitoring activities.

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Biological Monitor Duties

BIO-4 The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist shall remain the contact for the project owner, BLM's Authorized Officer and the CPM.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to BLM's Authorized Officer and the CPM and copies of all written reports and summaries that document biological resources compliance activities, including those conducted by Biological Monitors. If actions may affect biological resources during operation a Biological Monitor, under the supervision of the Designated Biologist, shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties cease, as approved by BLM's Authorized Officer and the CPM.

Designated Biologist and Biological Monitor Authority

BIO-5 The project owner's construction/operation manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources conditions of certification.

The Designated Biologist shall have the authority to immediately stop any activity that is not in compliance with these conditions and/or order any reasonable measure to avoid take of an individual of a listed species. If required by the Designated Biologist and Biological Monitor(s) the project owner's construction/operation manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist. The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. Inform the project owner and the construction/operation manager when to resume activities; and

3. Notify BLM's Authorized Officer and the CPM and if there is a halt of any activities and advise them of any corrective actions that have been taken or will be instituted as a result of the work stoppage.

If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies BLM's Authorized Officer and the CPM immediately (and no later than the morning following the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify BLM's Authorized Officer and the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by BLM's Authorized Officer and the CPM within five working days after receipt of notice that corrective action is completed, or the project owner will be notified by BLM's Authorized Officer and the CPM that coordination with other agencies will require additional time before a determination can be made.

Worker Environmental Awareness Program (WEAP)

BIO-6 The project owner shall develop and implement an Ivanpah SEGS-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from USFWS, CDFG, BLM's Authorized Officer and the CPM. The WEAP shall be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, and delivery personnel. The WEAP shall be implemented during site mobilization, ground disturbance, grading, construction, operation, and closure. The WEAP shall:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media, including photographs of protected species, is made available to all participants. The training presentation shall be made available in the language best understood by the participants;

2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas, and explain the reasons for protecting these resources; provide information to participants that Gila monsters are venomous and should not be handled, and that no snakes, reptiles, or other wildlife shall be harmed;

3. Place special emphasis on desert tortoise, including information on physical characteristics, distribution, behavior, ecology, sensitivity

to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;

4. Include a discussion of fire prevention measures to be implemented by workers during project activities; request workers dispose of cigarettes and cigars appropriately and not leave them on the ground or buried;

5. Present the meaning of various temporary and permanent habitat protection measures;

6. Identify whom to contact if there are further comments and questions about the material discussed in the program; and

7. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: At least 60 days prior to the start of any project-related site disturbance activities, the project owner shall provide to BLM's Authorized Officer and the CPM a copy of the draft WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to site and related facilities mobilization, the project owner shall submit two copies of the BLM- and CPM-approved final WEAP.

Training acknowledgement forms signed during construction shall be kept on file by the project owner for at least six months after the start of commercial operation.

Throughout the life of the project, the worker education program shall be repeated annually for permanent employees, and shall be routinely administered within one week of arrival to any new construction personnel, foremen, contractors, subcontractors, and other personnel potentially working within the project area. Upon completion of the orientation, employees shall sign a form stating that they attended the program and understand all protection measures. These forms shall be maintained by the project owner and shall be made available to BLM's Authorized Officer and the CPM and upon request. Workers shall receive and be required to visibly display a hardhat sticker or certificate that they have completed the training.

During project operation, signed statements for operational personnel shall be kept on file for six months following the termination of an individual's employment.

Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)

BIO-7 The project owner shall develop a BRMIMP and submit two copies of the proposed BRMIMP to the BLM-Authorized Officer and the CPM (for review and approval) and shall implement the measures identified in the approved BRMIMP. The BRMIMP shall incorporate avoidance and minimization measures described in final versions of the Desert Tortoise Translocation Plan, the Raven Management Plan, the Closure, Revegetation and Rehabilitation Plan, the Burrowing Owl Mitigation and Monitoring Plan, and the Weed Management Plan.

The BRMIMP shall be prepared in consultation with the Designated Biologist and include the following:

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;

2. All biological resources conditions of certification identified as necessary to avoid or mitigate impacts;

3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion;

4. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;

5. All required mitigation measures for each sensitive biological resource;

6. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

7. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction and operation;

8. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities; include one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Provide planned timing of aerial photography and a description of why times were chosen. Provide a final accounting of the before/after

acreages and a determination of whether additional habitat compensation is necessary in the Construction Termination Report;

9. Duration for each type of monitoring and a description of monitoring methodologies and frequency;

10. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;

11. All performance standards and remedial measures to be implemented if performance standards are not met;

12. A discussion of biological resources-related facility closure measures including a description of funding mechanism(s); and

13. A process for proposing plan modifications to BLM's Authorized Officer and the CPM and appropriate agencies for review and approval; and

Verification: The project owner shall submit the BRMIMP to the BLM Authorized Officer and the CPM at least 60 days prior to start of any project-related site disturbance activities. The BRMIMP shall contain all of the required measures included in all biological Conditions of Certification. No ground disturbance may occur prior to approval of the final BRMIMP by BLM's Authorized Officer and the CPM.

BLM's Authorized Office and the CPM, in consultation with other appropriate agencies, will determine the BRMIMP's acceptability within 45 days of receipt. If there are any permits that have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to BLM's Authorized Office and the CPM within five days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition within at least 10 days of their receipt by the project owner. Ten days prior to site and related facilities mobilization the revised BRMIMP shall be resubmitted to BLM's Authorized Officer and the CPM.

The project owner shall notify BLM's Authorized Officer and the CPM and no less than five working days before implementing any modifications to the approved BRMIMP to obtain BLM's Authorized Officer and CPM approval.

Any changes to the approved BRMIMP must also be approved by BLM's Authorized Officer and the CPM and in consultation with appropriate agencies to ensure no conflicts exist.

Implementation of BRMIMP measures (construction activities that were monitored, species observed) will be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project

construction, the project owner shall provide to BLM's Authorized Officer and the CPM, for review and approval, a written construction termination report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

Desert Tortoise Clearance Surveys and Fencing

BIO-8 The project owner shall undertake appropriate measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to desert tortoise. Methods for clearance surveys, fence installation, tortoise handling, artificial burrow construction, egg handling and other procedures would be consistent with those described in the *Guidelines for Handling Desert Tortoise During Construction Projects* (Desert Tortoise Council 1999) or more current guidance provided by CDFG and USFWS. The project owner shall also implement all terms and conditions described in the Biological Opinion prepared by USFWS. These measures include, but are not limited to, the following:

1. Fence Installation. To avoid impacts to desert tortoises the proposed fence alignment shall be flagged and the alignment surveyed within 24 hours prior to the initiation of construction of tortoise-exclusion fence. Surveys shall be conducted by the Designated Biologist(s) using techniques approved by the USFWS and CDFG. Biological Monitors may assist the Designated Biologist under his or her supervision. These surveys shall provide 100-percent coverage of all areas to be disturbed and an additional transect along both sides of the fence line. This fence line transect will cover an area approximately 90 feet wide centered on the fence alignment. Transects would be no greater than 30 feet apart. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined to assess occupancy of each burrow by desert tortoises and handled in accordance with USFWS-approved protocol.

2. Fence Installation. Prior to the initiation of construction activities for each solar plant, the project owner shall enclose the boundary of the affected solar plant with permanent chain-link fencing for security purposes and permanent desert tortoise exclusionary fencing would be attached to the bottom of the chain link fencing. The fence installation shall be supervised by the Designated Biologist and monitored by the Biological Monitors to ensure the safety of any tortoise present.

   a. Fence Material and Installation. The permanent tortoise exclusionary fencing shall consist of galvanized hard wire cloth 1-inch by 2-inch mesh sunk 12 inches into the ground, and 24

inches above the ground (but not less than 18 inches above the ground) (USFWS 2008). The fencing shall be buried approximately 6 inches below ground or bent at a right angle towards the outside of the project site and covered with dirt, rocks or gravel to discourage the tortoise from digging under the fence

b. Security Gates. Security gates shall be designed with minimal ground clearance to deter ingress by tortoises. The gates may be electronically activated to open and close immediately after the vehicle(s) have entered or exited to prevent the gates from being kept open for long periods of time. Cattle grating designed to safely exclude desert tortoise shall be installed at the gated entries to discourage tortoises from gaining entry

c. Utility Corridor Fencing. The utility rights-of-way shall be temporarily fenced on each side of the right-of-way prior to ground disturbing activities to prevent desert tortoise entry during construction. Temporary fencing must follow guidelines for permanent fencing and supporting stakes shall be sufficiently spaced to maintain fence integrity.

d. Fence Inspections. Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing in the utility corridors, the fencing shall be regularly inspected. Permanent fencing shall be inspected monthly and during/following all major rainfall events. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within two days of observing damage. Inspections of permanent site fencing shall occur for the life of the project. Temporary fencing must be inspected weekly and, where drainages intersect the fencing, during and immediately following major rainfall events. All temporary fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area for tortoise.

3. Clearance Surveys. Following construction of the security fence and the attached tortoise exclusion fence, the fenced area shall be cleared of tortoises by Biological Monitors under the supervision of the Designated Biologist. Two complete passes with complete coverage shall be conducted as described above. If a desert tortoise is located on the second survey, a third survey would be conducted. Transects would be no wider than 30 feet. Each separate survey would be walked in a different direction to allow

opposing angles of observation. Vegetation salvage operations shall not begin until the area is deemed free of desert tortoises.

4. Burrow Searches. During clearance surveys all potential desert tortoise burrows within the fenced area shall be inspected to determine if tortoises are present. In some cases, a fiber optic scope may be needed to determine presence or absence within a deep burrow. To prevent reentry by a tortoise or other wildlife, all burrows shall be collapsed once absence has been determined. Tortoises taken from burrows and from elsewhere on the site shall be relocated or translocated as described in the Desert Tortoise Relocation/Translocation Plan.

5. Burrow Excavation/Handling. All potential desert tortoise burrows located would be excavated by hand by a Biological Monitor, tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises. Burrows inhabited by tortoises shall be excavated using hand tools under the supervision of the Designated Biologist. If excavated during May through July, the Biological Monitor would search for desert tortoise nests/eggs, which are typically located near the entrance to burrows. All desert tortoise handling and removal, and burrow excavations, including nests, would be conducted by the Designated Biologist or a Biological Monitor in accordance with the Service-approved protocol (Desert Tortoise Council 1994, revised 1999). If the Desert Tortoise Council releases a revised protocol for handling of desert tortoises before initiation of project activities, the revised protocol would be implemented for the project.

6. Monitoring During Clearing. Following the tortoise clearance and translocation, workers and heavy equipment shall be allowed to enter the project site to perform vegetation salvage and earth work such as clearing, grubbing, leveling, trenching, and installation of heliostats. A Biological Monitor shall monitor clearing and grading activities to find and move tortoises missed during the initial tortoise clearance survey. Should a tortoise be discovered, it shall be relocated or translocated as described in the Desert Tortoise Relocation/Translocation Plan to an area approved by the Designated Biologist.

7. Reporting. The Designated Biologist shall record the following information for any desert tortoises handled: a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether desert tortoise voided their bladders; c) location moved from and location moved to (using GPS technology); d) gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral

scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled desert tortoise as described in the paragraph below. Desert tortoise moved from within project areas shall be marked for future identification as described in *Guidelines for Handling Desert Tortoise during Construction Projects* (Desert Tortoise Council 1999) or more current guidance on the USFWS website. Digital photographs of the carapace, plastron, and fourth costal scute shall be taken. Scutes shall not be notched for identification.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of desert tortoise clearance surveys the Designated Biologist shall submit a report to BLM's Authorized Officer, the CPM, USFWS, and CDFG describing how each of the mitigation measures described above has been satisfied. The report shall include the desert tortoise survey results, capture and release locations of any relocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.

Desert Tortoise Translocation Plan

BIO-9 The project owner shall develop and implement a final Desert Tortoise Relocation/Translocation Plan (Plan) that is consistent with current USFWS approved guidelines, and meets the approval of BLM, USFWS, CDFG and Energy Commission staff. The final Plan shall be based on the draft Desert Tortoise Relocation/Translocation Plan prepared by the applicant dated May 2009 and shall include all revisions deemed necessary by BLM, USFWS, CDFG and the Energy Commission staff.

Verification: Within 60 days of publication of the Energy Commission Decision the project owner shall provide BLM's Authorized Officer and the CPM with the final version of a Desert Tortoise Relocation/Translocation Plan that has been reviewed and approved by BLM, USFWS, CDFG and Energy Commission staff. BLM's Authorized Officer and the CPM will determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved translocation must be made only after consultation with BLM's Authorized Officer, the CPM, USFWS, and CDFG. The project owner shall notify BLM's Authorized Officer and the CPM no fewer than 5 working days before implementing any BLM- and CPM-approved modifications to the Plan.

Within 30 days after initiation of translocation activities, the Designated Biologist shall provide to BLM's Authorized Officer and the CPM for review and approval, a written report identifying which items of the Plan have been completed, and a summary of all modifications to measures made during implementation of the Plan.

Desert Tortoise Compliance Verification

BIO-10 The project owner shall provide Energy Commission and BLM representatives with reasonable access to the project site and mitigation lands under the control of the project owner and shall otherwise fully cooperate with the Energy Commission's and BLM's efforts to verify the project owner's compliance with, or the effectiveness of, mitigation measures set forth in the conditions of certification. The project owner shall hold the Designated Biologist, the Energy Commission, and BLM harmless for any costs the project owner incurs in complying with the management measures, including stop work orders issued by BLM's Authorized Officer, the CPM, or the Designated Biologist. The Designated Biologist shall do all of the following:

1. Notify BLM's Authorized Officer and the CPM and at least 14 calendar days before initiating vegetation salvage or ground-disturbing activities;

2. Immediately notify BLM's Authorized Officer and the CPM in writing if the project owner is not in compliance with any conditions of certification, including but not limited to any actual or anticipated failure to implement mitigation measures within the time periods specified in the conditions of certification;

3. Remain onsite daily while vegetation salvage, grubbing, grading and heliostat installation activities are taking place to avoid or minimize take of listed species, to check for compliance with all impact avoidance and minimization measures, and to check all exclusion zones to ensure that signs, stakes, and fencing are intact and that human activities are restricted in these protective zones.

4. Maintain and check desert tortoise exclusion fences on a daily basis to ensure the integrity of the fence is maintained. The Designated Biologist shall be present onsite to monitor construction and determine fence placement during fence installation.

5. Conduct compliance inspections at a minimum of once per month after clearing, grubbing, grading, and heliostat installation activities are completed and submit a monthly compliance report to BLM's Authorized Officer and the CPM ;

6. No later than January 31 of every year the ISEGS facility remains in operation, provide BLM's Authorized Officer and the CPM an annual Listed Species Status Report, which shall include, at a minimum: 1) a general description of the status of the project site and construction activities, including actual or projected completion dates, if known; 2) a copy of the table in the BRMIMP with notes

showing the current implementation status of each mitigation measure; and 3) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and compensating for project impacts;

7. Ensure that all observations of listed species and their sign during project activities are reported to the Designated Biologist for inclusion in the next monthly compliance report submitted to BLM's Authorized Officer and the CPM;

8. No later than 45 days after the first sale of power provide BLM's Authorized Officer and the CPM a Final Listed Species Mitigation Report that shall include, at a minimum: 1) a copy of the table in the BRMIMP with notes showing when each of the mitigation measures was implemented; 2) all available information about project-related incidental take of listed species; 3) information about other project impacts on the listed species; 4) construction dates; 5) an assessment of the effectiveness of conditions of certification in minimizing and compensating for project impacts; 6) recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future projects on the listed species; and 7) any other pertinent information, including the level of take of the listed species associated with the project;

9. In the event of a sighting in an active construction area (e.g., with equipment, vehicles, or workers), injury, kill, or relocation of any listed species, notify BLM's Authorized Officer, the CPM, CDFG and USFWS immediately by phone and in no event later than noon on the business day following the event if it occurs outside normal business hours so that the agencies can determine what further actions, if any, are required to protect listed species;

10. Prepare written follow-up notification via FAX or electronic communication to these agencies within 2 calendar days of the incident and include the following information as relevant:

    a. If a desert tortoise is injured as a result of project related activities during construction, the Designated Biologist will immediately take it to a BLM- and CPM-approved wildlife rehabilitation and/or veterinarian clinic. Any veterinarian bills for such injured animals will be paid by the project owner. Following phone notification as required above, BLM's Authorized Officer, the CPM, CDFG, and USFWS will determine the final disposition of the injured animal, if it recovers. Written notification shall include, at a minimum, the date, time, location, circumstances of the incident, and the name of the facility where the animal was taken.

b. If a desert tortoise is killed by project-related activities during construction, or if a desert tortoise is otherwise found dead, submit a written report with the same information as an injury report. These desert tortoises shall be salvaged according to guidelines described in *Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoise* prepared by Kristin Berry, June 2001. The project owner shall pay to have these desert tortoises necropsied. The report shall include the date and time of the finding or incident.

c. BLM's Authorized Officer and the CPM may issue the project owner a written stop work order to suspend any activity related to the construction or operation of the project for an appropriate period determined in consultation with BLM's Authorized Officer and the CPM in order to prevent or remedy a violation of one or more conditions of certification (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. The project owner shall comply with the stop work order immediately upon receipt thereof.

Verification: No later than 2 calendar days following the above required notification of a sighting, kill, or relocation of a listed species, the project owner shall deliver to BLM's Authorized Officer, the CPM, CDFG, and USFWS via FAX or electronic communication the written report from the Designated Biologist describing all reported incidents of injury, kill, or relocation of a listed species, identifying who was notified, and explaining when the incidents occurred. In the case of a sighting in an active construction area, the project owner shall, at the same time, submit a map (e.g., using Geographic Information Systems) depicting both the limits of construction and sighting location to BLM's Authorized Officer, the CPM, CDFG and USFWS.

Impact Avoidance and Minimization Measures

BIO-11 During construction the project owner shall implement all feasible measures to avoid or minimize impacts to biological resources, including the following:

1. Limit Disturbance Areas. The boundaries of all areas to be disturbed (including staging areas, access roads, and sites for temporary placement of spoils) shall be delineated with stakes and flagging prior to construction activities in consultation with the Designated Biologist. Spoils and topsoil shall be stockpiled in disturbed areas lacking native vegetation and which do not provide habitat for special-status species. All disturbances, project vehicles and equipment shall be confined to the flagged areas.

2. Minimize Road Impacts. New and existing roads that are planned for construction, widening, or other improvements shall not extend beyond the flagged impact area as described above. All vehicles passing or turning around will do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads or the construction zone, the route will be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.

3. Minimize Traffic Impacts. Vehicular traffic during project construction and operation shall be confined to existing routes of travel to and from the project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit shall not exceed 20 miles per hour within the project area, on maintenance roads for linear facilities, or on access roads to the ISEGS site.

4. Monitor During Construction. The Designated Biologist or Biological Monitor shall be present at the construction site during all project activities that have potential to disturb soil, vegetation, and wildlife. In areas that have not been fenced with tortoise exclusion fencing and cleared, the USFWS-approved Designated Biologist or Biological Monitor shall walk immediately ahead of equipment during brushing and grading activities.

5. .Minimize Impacts of Transmission/Pipeline Alignments, Roads, Staging Areas. Staging areas for construction on the plant site shall be within the area that has been fenced with desert tortoise exclusion fencing and cleared. For construction activities outside of the plant site (transmission line, pipeline alignments) access roads, pulling sites, and storage and parking areas shall be designed, installed, and maintained with the goal of minimizing impacts to native plant communities and sensitive biological resources. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Mitigating Bird Collisions with Power Lines (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions.

6. Avoid Use of Toxic Substances. Road surfacing and sealants as well as soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.

7. .Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards wildlife habitat. To minimize risk of avian collisions with the

heliostat towers, only flashing or strobe lights shall be installed on these towers.

8. Badger Surveys. Concurrent with the desert tortoise clearance survey, the Designated Biologist or Biological Monitors shall perform a preconstruction survey for badger dens in the project area, including areas within 250 feet of all project facilities, utility corridors, and access roads. If badger dens are found, each den shall be classified as inactive, potentially active, or definitely active. Inactive dens shall be excavated by hand and backfilled to prevent reuse by badgers. Potentially and definitely active dens shall be monitored by the Designated Biologist or Biological Monitor for three consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) at the entrance. If no tracks are observed in the tracking medium after 3 nights, the den shall be excavated and backfilled by hand. If tracks are observed, the applicant shall develop and implement a trapping and relocation plan in consultation with the Designated Biologist and CDFG. BLM approval may be required prior to release of badgers on public lands.

9. Gila Monster Surveys. If a Gila monster is encountered during clearance surveys or during construction, a qualified biologist experienced with Gila monster survey and capture techniques shall capture and maintain it in a cool (<85 degrees F) environment until it can be released to a safe, suitable area beyond the construction impact zone. The biologist shall coordinate with staff and CDFG biologists in the transport and relocation of any Gila monsters encountered during project surveys, construction, or operation.

10. Avoid Vehicle Impacts to Desert Tortoise. Parking and storage shall occur within the area enclosed by desert tortoise exclusion fencing to the extent feasible. No vehicles or construction equipment parked outside the fenced area shall be moved prior to an inspection of the ground beneath the vehicle for the presence of desert tortoise. If a desert tortoise is observed, it will be left to move on its own. If it does not move within 15 minutes, a Designated Biologist or Biological Monitor may remove and relocate the animal to a safe location if temperatures are within the range described in the USFWS protocol (www.fws.gov/ventura/speciesinfo/protocols_guidelines and Desert Tortoise Council 1999).

11. Avoid Wildlife Pitfalls:

    a. Backfill Trenches. At the end of each work day, the Designated Biologist shall ensure that all potential wildlife pitfalls (trenches,

bores, and other excavations) outside the area fenced with desert tortoise exclusion fencing have been backfilled. If backfilling is not feasible, all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access, or fully enclosed with desert tortoise-exclusion fencing. All trenches, bores, and other excavations outside the areas permanently fenced with desert tortoise exclusion fencing shall be inspected periodically throughout the day and at the end of each workday by the Designated Biologist or a Biological Monitor. Should a tortoise or other wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual as described in the Desert Tortoise Relocation/Translocation Plan. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.

b. Avoid Entrapment of Desert Tortoise. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches aboveground and within desert tortoise habitat (i.e., outside the permanently fenced area) for one or more nights, shall be inspected for tortoises before the material is moved, buried or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on pipe racks. These materials would not need to be inspected or capped if they are stored within the permanently fenced area after the clearance surveys have been completed.

c. Cap Heliostat Holes. All holes drilled for heliostats shall be capped the same day they are drilled. Caps shall remain on the holes until heliostats are inserted into the holes, and shall be securely fastened and sufficiently sturdy to cover the heliostat holes indefinitely. The caps shall exclude all wildlife, and shall be inspected weekly by the Designated Biologist or Biological Monitors to ensure that the caps remain in place and that birds and terrestrial wildlife have not become trapped.

12. Minimize Standing Water. Water applied to construction areas and dirt roads for dust abatement shall use the minimal amount needed to meet safety and air quality standards in an effort to prevent the formation of puddles, which could attract desert tortoises, common ravens and coyotes to construction sites.

13. Dispose of Roadkilled Animals. Road killed animals or other carcasses detected in the project area or on roads near the project area shall be picked up immediately upon detection and

appropriately disposed of to avoid attracting common ravens and coyotes.

14. Minimize Spills of Hazardous Materials. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed of any hazardous spills immediately as directed in the project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.

15.. Worker Guidelines. During construction all trash and food-related waste shall be placed in self-closing containers and removed daily from the site. Workers shall not feed wildlife or bring pets to the project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons. Vehicular traffic shall be confined to existing routes of travel to and from the project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit when traveling on Colosseum Road and other dirt access routes within desert tortoise habitat shall not exceed 20 miles per hour.

16. Monitor Ground Disturbing Activities Prior to Site Mobilization. If ground-disturbing activities are required prior to site mobilization, such as for geotechnical borings or hazardous waste evaluations, a Designated Biologist or Biological Monitor shall be present to monitor any actions that could disturb soil, vegetation, or wildlife.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures will be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to BLM's Authorized Officer and the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

Raven Management Plan

BIO-12 The project owner shall implement a Raven Management Plan that is consistent with the most current USFWS-approved raven management guidelines, and which meets the approval of USFWS, CDFG, BLM, and the Energy Commission staff. The draft Raven Management Plan submitted by

the Applicant (CH2M Hill 2008f) shall provide the basis for the final plan, subject to review and revisions from USFWS, CDFG, BLM, and the Energy Commission staff.

Verification: At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide BLM's Authorized Officer, the CPM, USFWS, and CDFG with the final version of a Raven Management Plan that has been reviewed by USFWS, CDFG, BLM, and the Energy Commission staff. The CPM and BLM's Authorized Officer will determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Raven Management Plan shall be made only after consultation with BLM and Energy Commission staff, USFWS, and CDFG. The project owner shall notify BLM's Authorized Officer and the CPM no less than 5 working days before implementing any BLM- and CPM-approved modifications to the Raven Management Plan.

Within 30 days after completion of project construction, the project owner shall provide to the CPM for review and approval, a written report identifying which items of the Raven Management Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

Weed Management Plan

BIO-13 The project owner shall implement a Weed Management Plan that meets the approval of BLM and the Energy Commission staff. The draft Weed Management Plan submitted by the applicant (CH2M Hill 2008e) shall provide the basis for the final plan, subject to review and revisions from BLM and Energy Commission staff, USFWS, and CDFG. In addition to describing weed eradication and control methods, and a reporting plan for weed management during and after construction, the final Weed Management Plan shall include at least the following Best Management Practices to prevent the spread and propagation of noxious weeds:

1. Limit the size of any vegetation and/or ground disturbance to the absolute minimum, and limit ingress and egress to defined routes.

2. Maintain vehicle wash and inspection stations and closely monitor the types of materials brought onto the site.

3. Reestablish vegetation quickly on disturbed sites.

4. Monitoring and rapid implementation of control measures to ensure early detection and eradication for weed invasions.

5. Use only weed-free straw or hay bales used for sediment barrier installations, and weed-free seed.

6. Reclamation and revegetation shall occur on all temporarily disturbed areas, including pipelines, transmission lines, and staging areas.

Verification: At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide BLM's Authorized Officer and the CPM with the final version of a Weed Management Plan that has been reviewed and approved by BLM, and Energy Commission staff, USFWS, and CDFG. BLM's Authorized Officer and the CPM will determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Weed Control Plan must be made only after consultation with the Energy Commission staff, BLM, USFWS, and CDFG. The project owner shall notify the CPM no less than 5 working days before implementing any BLM- and CPM-approved modifications to the Weed Management Plan.

Within 30 days after completion of project construction, the project owner shall provide to BLM's Authorized Officer and the CPM for review and approval, a written report identifying which items of the Weed Management Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

Closure, Revegetation and Rehabilitation PLAN

BIO-14 The project owner shall develop and implement a revised Closure, Revegetation and Rehabilitation Plan (Plan) in cooperation with BLM and Energy Commission staff, USFWS and CDFG to guide site restoration and closure activities, including methods proposed for revegetation of disturbed areas immediately following construction and rehabilitation and revegetation upon closure of the facility. This plan must address preconstruction salvage and relocation of succulent vegetation from the site to either an onsite or nearby nursery facility for storage and propagation of material to reclaim disturbed areas. In the case of unexpected closure, the plan should assume restoration activities could possibly take place prior to the anticipated lifespan of the plant. The Plan shall address all issues discussed in **Biological Resources Appendix-A**: *Revisions to Draft Closure, Revegetation and Rehabilitation Plan*, and shall include but is not limited to the following elements in the revised plan:

1. Plan Purpose: The plan shall explicitly identify the objective of the revegetation plan to be re-creation of the types of habitats lost during construction and operation of the proposed solar energy facility. The final revegetation plan shall include introduction of mid- to late-successional species.

2. Standards/Monitoring: Performance standards for success thresholds, weed cover, performance monitoring methods and schedule, and maintenance monitoring in the revised Plan shall be conducted as described in **Biological Resources Appendix B**.

3. Baseline Surveys – Baseline vegetation surveys for planning restoration efforts shall be conducted as described in **Biological Resources Appendix B.**

4. Vegetation Clearing: Clearing of vegetation shall be limited to areas for which final maps are provided to BLM before approval of the ROW. Clearing of vegetation will be permitted on roads, utility routes, heliostat maintenance pathways, building and parking areas, and temporary staging areas provided these are specifically documented on a georeferenced construction alignment drawing or aerial photo or shape file, showing the exact locations of soil disturbance. BLM will consider
   relocating specific installations prior to the beginning of construction and during construction on a case by case basis but will not approve additional acreage beyond that addressed in the current application.

5. Vegetation Mowing; Vegetation mowing shall be limited to areas adjoining vehicle pathways used for heliostat installation to allow installation of the heliostat pylon and allow for tracking clearance under the heliostat. Vegetation mowing may be repeated during the life of the facility to maintain appropriate clearance for heliostat tracking.

6. Succulent Salvage: The revised Plan shall include a table that shows proposed succulent salvage by species the number of plants onsite, the lower threshold height for salvage, the number in each size class, and the fate of plants not salvaged. An inventory and map of proposed succulent transplants shall be provided as described in Appendix A. Information gained from succulent transplant experience gained in ISEGS 1 shall be applied to future salvage operations, as described in **Biological Resources Appendix B**.

7. Seed Handling: Seed collection, testing and application shall be conducted as described in **Biological Resources Appendix B**, with collection areas within 10 miles of the project boundaries and on similar terrain, soil, exposure, slope, and elevation to the project site.

8. Soil Preparation: Soil descriptions, compaction measurements, mulch application, soil storage, seed farming, mycorrhizal inoculation, and biological crust collection and storage shall be conducted as described in **Biological Resources Appendix B.**

Soil stockpiles shall not be placed on areas that support special-status plant species or other sensitive biological resources.

9. Weed Management. Weed management activities needed to control weeds resulting from mirror washing shall be conducted as described in **Biological Resources Appendix B**.

10. Final Closure Plan**.** A Final Closure Plan, which addresses the final revegetation and rehabilitation activities upon closure and decommissioning of the project, shall be completed as part of the revised Plan. The Final Closure Plan shall include a cost estimate, adjusted for inflation, reflecting the costs of the revegetation, rehabilitation, and monitoring for the duration of time estimated to achieve the objective of re-creating plant communities impacted by the project.

Verification: No more than 30 days from the Energy Commission Decision and BLM Record of Decision the project owner shall provide BLM's Authorized Officer and the CPM with a draft version of the revised Closure, Revegetation and Rehabilitation Plan. At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide BLM's Authorized Officer and the CPM with the final version of the Closure, Revegetation and Rehabilitation Plan that has been reviewed and approved by BLM, USFWS, CDFG, and the Energy Commission staff. All modifications to the approved Revegetation and Reclamation Plan must be made only after consultation with BLM's Authorized Officer, the CPM, USFWS and CDFG. The project owner shall notify BLM's Authorized Officer and the CPM and no less than 5 working days before implementing any BLM- and CPM-approved modifications to the Closure, Revegetation and Rehabilitation Plan.

Within 30 days after completion of project construction for each phase of development, the project owner shall provide to BLM's Authorized Officer and the CPM for review and approval, a written report identifying which items of the Closure, Revegetation and Rehabilitation Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

At least one year prior to planned closure and decommissioning the project owner shall submit to the BLM-Authorized Officer and the CPM a final Closure Plan for review to determine if revisions are needed. The project owner shall incorporate all required revisions to the final Closure Plan and submit to the BLM-Authorized Officer and the CPM no less than 90 days prior to the start of ground disturbing activities associated with closure and decommissioning activities.

Pre-Construction Nest Surveys

BIO-15 Pre-construction nest surveys shall be conducted if construction activities will occur from February 1 through August 31. The

Designated Biologist or Biological Monitor conducting the surveys shall be experienced bird surveyors familiar with standard nest-locating techniques and shall perform surveys in accordance with the following guidelines:

1. Surveys shall cover all potential nesting habitat in the project site or within 500 feet of the boundaries of the site and linear facilities;

2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. One of the surveys needs to be conducted within the 14-day period preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;

3. If active nests are detected during the survey, a buffer zone (protected area surrounding the nest, the size of which is to be determined by the Designated Biologist in consultation with CDFG) and monitoring plan shall be developed. Nest locations shall be mapped and submitted, along with a report stating the survey results, to the CPM; and

4. The Designated Biologist shall monitor the nest until he or she determines that nestlings have fledged and dispersed; activities that might, in the opinion of the Designated Biologist, disturb nesting activities, shall be prohibited within the buffer zone until such a determination is made.

Verification: At least 10 days prior to the start of any project-related ground disturbance activities, the project owner shall provide the CPM a letter-report describing the findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor (s); and a list of species observed. If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest.

Burrowing Owl Impact Avoidance and Minimization Measures

BIO-16 The project owner shall implement the following measures for the burrowing owl:

1. Complete a pre-construction survey for burrowing owls for any areas subject to disturbance from construction prior to the start of initial ground disturbance activities. If burrowing owls are present within 500 feet of the project site or linear facilities, then the CDFG burrowing owl guidelines (1995) shall be implemented;

2. Monitor burrowing owl pairs within 500 feet of any activities that exceed ambient noise and/or vibration levels;

3. Establish a 500-foot set back from any active burrow and construct additional noise/visual barriers (e.g., haystacks or plywood fencing) to shield the active burrow from construction activities. Post signs (in both English and Spanish) designating presence of sensitive area;

4. Actively relocate all owls occupying burrows that will be temporarily or permanently impacted by the project and implement the following CDFG take avoidance measures:

   a. Occupied burrows shall not be disturbed during the nesting season (February 1 – August 31) unless a qualified biologist can verify through non-invasive methods that egg laying/incubation has not begun or juveniles are foraging independently and able to fly;

   b. A qualified biologist must relocate owls, confirm that owls have left burrows prior to ground-disturbing activities, and monitor the burrows. Once evacuation is confirmed, the biologist should hand excavate burrows and then fill burrows to prevent reoccupation; and

   c. Relocation of owls shall be approved by and conducted in consultation with CDFG.

5. Submit a Burrowing Owl Mitigation and Monitoring Plan to the CPM and CDFG for review and approval prior to relocation of owls (and incorporate it into the project's BRMIMP) as well as a construction termination report with results to CDFG and CPM 30 days after completing owl relocation and monitoring and at least 30 days prior to the start of commercial operation.

Verification: The project owner shall complete a pre-construction survey for burrowing owls for any areas subject to disturbance from construction no more than 30 days prior to the start of any project-related site disturbance activities, and submit a report to CDFG, USFWS, BLM's Authorized Officer and the CPM that describes when surveys were completed, observations, mitigation measures, and the results of the mitigation. If burrowing owls are to be protected on site or relocated, the project owner shall coordinate with and report to CDFG, USFWS, BLM and Energy Commission staff on these proposed activities in a Burrowing Owl Mitigation and Monitoring Plan. Within 30 days after completion of owl relocation and monitoring, and the start of ground disturbance **or** at least 90 days prior to the sale of power, the project owner shall provide to the CDFG and CPM a written construction termination report identifying how measures have been completed.

Desert Tortoise Compensatory Mitigation

BIO-17 To fully mitigate for habitat loss and potential take of desert tortoise, the project owner shall provide compensatory mitigation at a 3:1 ratio for impacts to 4,073 acres or the area disturbed by the final project footprint. At least two thirds of the 3:1 mitigation to satisfy the Energy Commission's Complementary Mitigation Measures shall be achieved by acquisition, in fee title or in easement, of no less than 8,146 acres of land suitable for desert tortoise. The project owner shall provide funding for the acquisition, initial habitat improvements and long-term management endowment of these Energy Commission complementary compensation lands. The remaining third of the 3:1 compensatory mitigation, to satisfy BLM's mitigation requirements and the balance of the Energy Commission's mitigation requirements, shall be developed in accordance with BLM's desert tortoise mitigation requirements as described in the Northern and Eastern Mojave Desert Management Plan (BLM 2002). BLM's compensatory mitigation plan, serving as one third of the 3:1 mitigation ratio required to satisfy CESA, would include acquisition of up to 4,073 acres of land within the Eastern Mojave Recovery Unit, or desert tortoise habitat enhancement or rehabilitation activities that meet BLM, CDFG, USFWS and Energy Commission approval, or some combination of the two. The Energy Commission requirements for acquisition of 8,146 acres of compensation lands shall include the following:

1. Responsibility for Acquisition of Lands: The responsibility for acquisition of lands may be delegated by written agreement from the Energy Commission and CDFG to a third party, such as a non-governmental organization supportive of Mojave Desert habitat conservation. Such delegation shall be subject to approval by the CPM and CDFG, in consultation with BLM and USFWS, prior to land acquisition, enhancement or management activities. If habitat disturbance exceeds that described in this analysis, the project owner shall be responsible for funding acquisition, habitat improvements and long-term management of additional compensation lands or additional funds required to compensate for any additional habitat disturbances. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. Water and mineral rights shall be included as part of the land acquisition. Agreements to delegate land acquisition to CDFG or an approved third party and to manage compensation lands shall be implemented within 18 months of the Energy Commission's decision.
2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition shall:

a. be as close to the project site as possible;

b. provide good quality habitat for desert tortoise with capacity to regenerate naturally when disturbances are removed;

c. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

d. be connected to lands currently occupied by desert tortoise, ideally with populations that are stable, recovering, or likely to recover;

e. not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible;

f. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration, and

g. not contain hazardous wastes.

3. Review and Approval of Compensation Lands Prior to Acquisition. A minimum of three months prior to acquisition of the property, the project owner shall submit a formal acquisition proposal to the CPM, CDFG, USFWS and BLM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for desert tortoise in relation to the criteria listed above. Approval from CDFG and the CPM, in consultation with BLM and the USFWS, shall be required for acquisition of all parcels comprising the 8,146 acres.

4. Energy Commission Complementary Mitigation Security The project owner shall provide financial assurances to the CPM and CDFG with copies of the document(s) to BLM and the USFWS, to guarantee that an adequate level of funding is available to implement the Energy Commission Complementary Mitigation Measures described in this condition. These funds shall be used solely for implementation of the measures associated with the project. Alternatively, financial assurance can be provided to the CPM and CDFG in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") prior to initiating ground-disturbing project activities. Prior to submittal to the CPM, the Security shall be approved by CDFG and

the CPM, in consultation with BLM and the USFWS, to ensure funding in the amount of $20,446,460. This Security amount was calculated as follows and may be revised upon completion of a Property Analysis Record (PAR) or PAR-like analysis of the proposed compensation lands:

a. land acquisition costs for compensation lands, calculated at $910/acre = $7,412,860;

b. costs of initial habitat improvements to compensation lands, calculated at $250/acre = $2,036,500;

c. costs of establishing an endowment for long-term management of compensation lands, calculated at $1,350/acre = $10,997,100; and

d. total security = $20,446,460.

5. Compensation Lands Acquisition Conditions The project owner shall comply with the following conditions relating to acquisition of the Energy Commission Complementary Mitigation compensation lands after the CDFG and the CPM, in consultation with BLM and the USFWS, have approved the proposed compensation lands and received Security as applicable and as described above.

   a. Preliminary Report: The project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary documents for the proposed 8,146 acres. All documents conveying or conserving compensation lands and all conditions of title/easement are subject to a field review and approval by CDFG and the CPM, in consultation with BLM and the USFWS, California Department of General Services and, if applicable, the Fish and Game Commission and/or the Wildlife Conservation Board.

   b. Title/Conveyance: The project owner shall transfer fee title or a conservation easement to the 8,146 acres of compensation lands to CDFG under terms approved by CDFG. Alternatively, a non-profit organization qualified to manage compensation lands (pursuant to California Government Code section 65965) and approved by CDFG and the CPM may hold fee title or a conservation easement over the habitat mitigation lands. If the approved non-profit organization holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG. If the approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If a Security is provided, the project owner or an

approved third party shall complete the proposed compensation lands acquisition within 18 months of the start of project ground-disturbing activities.

c. Initial Habitat Improvement Fund. The project owner shall fund the initial protection and habitat improvement of the 8,146 acres. Alternatively, a non-profit organization may hold the habitat improvement funds if they are qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the habitat improvement fund must go to CDFG.

d. Long-term Management Endowment Fund. Prior to ground-disturbing project activities, the project owner shall provide to CDFG a non-wasting capital endowment in the amount determined through the Property Analysis Record (PAR) or PAR-like analysis that will be conducted for the 8,146 acres. The project owner's financial responsibility for the actual cost of mitigation shall not increase by more than 25% of the Security Amount ($20,446,460). Alternatively, a non-profit organization may hold the endowment fees if they are qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the endowment must go to CDFG, where it will be held in the special deposit fund established pursuant to California Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation or similarly approved entity identified by CDFG shall manage the endowment for CDFG and with CDFG supervision.

e. Interest, Principal, and Pooling of Funds. The project owner, CDFG and the CPM shall ensure that an agreement is in place with the endowment holder/manager to ensure the following conditions:

- Interest. Interest generated from the initial capital endowment shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.

- Withdrawal of Principal. The endowment principal shall not be drawn upon unless such withdrawal is deemed necessary by the CDFG or the approved third-party endowment manager to ensure the continued viability of the species on the 8,146 acres. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established pursuant to Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation or similarly approved entity identified by CDFG will manage the endowment for CDFG with CDFG supervision.
- Pooling Endowment Funds. CDFG, or a CPM and CDFG approved non-profit organization qualified to hold endowments pursuant to California Government Code section 65965, may pool the endowment with other endowments for the operation, management, and protection of the 8,146 acres for local populations of desert tortoise. However, for reporting purposes, the endowment fund must be tracked and reported individually to the CDFG and CPM.
- Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other state or state approved federal agency reviews; and overhead related to providing compensation lands.

The project owner is responsible for all compensation lands acquisition/easement costs, including but not limited to, title and document review costs, as well as expenses incurred from other state agency reviews and overhead related to providing compensation lands to the department or approved third party; escrow fees or costs; environmental contaminants clearance; and other site cleanup measures.

Verification: A minimum of three months prior to acquisition of the property, the project owner shall submit a formal acquisition proposal to the CPM, CDFG, USFWS and BLM describing the parcels intended for purchase.

No later than 18 months following the publication of the Energy Commission Decision the project owner shall provide written verification to the CPM and CDFG that the Energy Commission Complementary Mitigation compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s). Alternatively, no later than 30 days prior to beginning project ground-disturbing activities, the project owner shall provide written verification of Security in accordance with this condition of certification. If Security

is provided, the project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition within 18 months of the start of project ground-disturbing activities. Within six months of the land or easement purchase, as determined by the date on the title, the project owner, or an approved third party, shall provide CDFG and the CPM with a management plan for the Energy Commission Complementary Mitigation compensation lands and associated funds. CDFG and the CPM shall review and approve the management plan, in consultation with BLM and the USFWS.

Within 90 days after completion of project construction, the project owner shall provide to the CPM and CDFG an analysis with the final accounting of the amount of habitat disturbed during project construction. If habitat disturbance exceeds 4,073 acres, the project owner shall provide a compensation plan to the CMP and CDFG for their review and approval, in consultation with BLM and the USFWS. The compensation plan shall be submitted no later than 90 days from the CPM's receipt of the final accounting, and shall include a description of additional funds required or lands that must be purchased to compensate for the unanticipated habitat disturbances, and a schedule for that acquisition or funding inclusive of all associated endowment and enhancement costs. The amount of funding for habitat acquisition, initial habitat improvement, and long-term management endowment shall be calculated at the adjusted market value at the time of construction. The project owner's financial responsibility for the actual cost of mitigation shall not increase by more than 25 percent of the Security Amount ($20,446,460).

Special-Status Plant Impact Avoidance And Minimization

BIO-18 The project owner shall implement the following measures to avoid and minimize impacts to special-status plant species. Items 2, 3, 5, 6, 7, and 10 are recommended exclusively by Energy Commission staff.

1. On-Site Plant Avoidance/Minimization Areas: To the extent feasible the project owner shall avoid and minimize disturbance to all special-status plant species within the project site. Impact avoidance and minimization efforts shall occur in all feasible locations but shall focus in particular on areas depicted in **Biological Resources Figure 2** that indicate the highest densities of Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla. The highest priorities for protection shall be small-flowered androstephium, Mojave milkweed, desert pincushion, and Rusby's desert-mallow. The project owner shall implement all feasible impact avoidance and minimization measures within the following areas:

    a. ISEGS 1 and 3: Reconfigure project features to the extent feasible within the northern portions of ISEGS 1 and 3 to avoid areas that support the highest density and diversity of special-status plant species.

b. Construction Logistics Area: Reconfigure the layout and design of the Construction Logistics Area to maximize protection of high density and diversity special-status plant areas.

c. Natural Gas Pipeline: Adjust the alignment of the proposed 75-foot wide natural gas pipeline and narrow the construction footprint to avoid special-status plant occurrences north of ISEGS 3.

2. Protection Goals : The project owner shall implement all feasible measures to protect 75 percent of the individuals of small-flowered androstephium, Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla within the project area (as mapped in Figure 5-3 of the applicant's final botanical survey report [CH2M Hill 2008x]). Each year during construction the measurement of percent protection achieved shall be calculated based on a comparison of numbers of individuals of each of these five species present in this area identified before construction compared to numbers remaining post –construction. These pre- and post-construction plant numbers shall be based on floristic surveys conducted by a qualified botanist.

3. Identify and Establish Special-Status Plant Protection Areas: The project owner shall identify Special-Status Plant Protection Areas within the project footprint as needed to achieve the 75 percent protection goal. To accurately identify the locations of these areas, pre-construction floristic surveys shall be conducted by a qualified botanist at the appropriate time of year for special-status plant identification including both spring and summer blooming periods. The surveys shall encompass all the high plant density areas depicted in **Biological Resources Figure 2** and shall extend 150 feet on both sides of the proposed gas pipeline alignment and 250 feet out from the project fenceline. The locations of the Special-Status Plant Protection Areas shall be clearly depicted on all final maps and project drawings and descriptions.

4. Protection of Adjacent Occurrences: The project owner shall identify special-status plants occurrences within 250 feet of the project fenceline during the pre-construction plant surveys described above. A qualified botanist shall delineate the boundaries of these special status plant occurrences prior to the initiation of ground disturbing activities. These flagged special status plant occurrences shall be designated as Environmentally Sensitive Areas on plans and specifications, and shall be protected from accidental impacts during construction (e.g. vehicle traffic, temporary placement of soils or vegetation) and from the indirect

impacts of project operation (herbicide spraying, changes in upstream hydrology, etc).

5. Develop and Implement a Special-Status Plant Protection and Monitoring Plan : The project owner shall develop and implement a Special-Status Plant Protection and Monitoring Plan for special-status plants occurring within the Special-Status Plant Protection Areas. The goal of the Special-Status Plant Protection and Monitoring Plan shall be to maintain the special-status plant species within the Special-Status Plant Protection Areas as healthy, reproductive populations that can be sustained in perpetuity. At a minimum, the Special-Status Plant Protection and Monitoring Plan shall:

   - establish baseline conditions and numbers of the plant occurrences within the Special-Status Plant Protection Areas and success standards for protection of special-status plant occurrences within the Plant Protection Areas;
   - provide information about microhabitat preferences and fecundity, essential pollinators, reproductive biology, and propagation and culture requirements for each special-status species;
   - describe measures (e.g., fencing, signage) to avoid direct construction and operation impacts to special-status plants within the Special-Status Plant Protection Areas;
   - describe measures to avoid or minimize indirect construction and operations impacts to special-status plants within the Special-Status Plant Protection Areas (e.g., runoff from mirror-washing, use of soil stabilizers/tackifiers, alterations of hydrology from drainage diversions, erosion/sedimentation from disturbed soils upslope, herbicide drift, the spread of non-native plants, etc).
   - provide a monitoring schedule and plan for assessing the numbers and condition of special-status plants within the Special-Status Plant Protection Areas; and
   - identify specific triggers for remedial action (e.g., numbers of plants dropping below a threshold);

6. Develop Special-Status Plant Remedial Action Plan : The project owner shall develop a detailed Special-Status Plant Remedial Action Plan to be implemented if special-status plants within the Plant Protection Areas fail to meet success standards described in the Special-Status Plant Protection and Monitoring Plan. The Plant Remedial Action Plan shall include specifications for ex-situ/offsite conservation of seed and other propagules, and the seed bank and

other symbionts contained in the topsoil where these plants occur. The remedial measures described in the Plant Remedial Action Plan shall not substitute for plant protection or other mitigation measures. The Special-Status Plant Remedial Action Plan shall include, at a minimum:

- guidelines for pre-construction seed collection (and/or other propagules) for each of the five species;
- specifications for collecting, storing, and preserving the upper layer of soil containing seed and important soil organisms;
- detailed replacement planting program with biologically meaningful quantitative and qualitative success criteria (see Pavlik 1996), monitoring specifications, and triggers for remedial action; and
- ecological specifications for suitable planting sites.

7. Seed Collection : Implementation of the Special-Status Plant Remedial Action Plan would require a source of local source of seeds/propagules. In addition, seed collection would serve to preserve germplasm in the event that all mitigation fails. The project owner shall develop and implement a Seed Collection Plan to collect and store seed for small-flowered androstephium, Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla. The source of these seeds shall be from plants proposed for removal within the project footprint. The project owner shall engage the services of a qualified contractor approved by the CPM to undertake seed collection and storage.

8. Gas Pipeline Revegetation and Monitoring: In the natural gas pipeline construction corridor where disturbed soils will be revegetated, the topsoil excavated shall be segregated, kept intact, and protected, under conditions shown to sustain seed bank viability. At a minimum, the top 2 cm of the soil shall be separately stored and preserved. Topsoil salvage, storing, and replacement shall be replaced in its original vertical orientation following pipeline installation ensuring the integrity of the top 2 cm in particular. The project owner shall prepare a Gas Pipeline Revegetation and Monitoring Plan targeted at re-establishment of Rusby's desert-mallow, desert pincushion, Mojave milkweed, and potentially other special-status plant species. The Gas Pipeline Revegetation and Monitoring Plan shall identify success criteria for re-establishment and shall continue for a period of no less than 10 years until the defined success criteria are achieved. The Gas Pipeline Revegetation and Monitoring Plan shall include measures for

seeding or other remedial actions. If no individuals of Rusby's desert-mallow, desert pincushion, or Mojave milkweed, are located during the first year of monitoring, the project owner shall conduct supplemental seeding or other remedial measures in the area disturbed by natural gas pipeline installation.

9. Surveys on Acquired and Public Lands: The project owner shall conduct floristic surveys for Rusby's desert-mallow and Mojave milkweed on all lands that will be acquired as part of the desert tortoise compensatory mitigation requirements (see Condition of Certification **BIO-17**). Similar surveys shall be conducted for small-flowered androstephium, desert pincushion, nine-awned pappus grass, and Parish's club-cholla for those species for which the 75 percent on-site avoidance goal has not been achieved. The goal of the surveys shall be to identify at least the same number of occurrences on off-site lands as were impacted by the ISEGS project. If this goal is not met by surveys on proposed acquisition lands, additional surveys shall be conducted within suitable habitat on public lands until the same number of occurrences of each species that were impacted are identified. To be counted toward fulfillment of the goal the occurrences must reflect new data not previously documented in other survey efforts. The survey requirements shall include the following:

   - All surveys shall be conducted by a qualified botanist in accordance with BLM, CDFG, and CNPS plant survey guidelines;
   - Surveys shall occur the first spring after construction begins and continue each year until the same number of special-status plant occurrences are identified on acquisition lands and/or BLM lands as were impacted, or predicted to be impacted based on final site design, by the ISEGS project construction and operation;
   - For each year surveys are conducted yearly survey results shall be provided to the CPM, BLM's Authorized Officer and CDFG, and shall include CNDDB field survey forms for all special-status plant species encountered during the surveys; and
   - All field survey forms shall be submitted to the CNDDB at the time of submittal to the CPM, BLM and CDFG.
   - For each of the species for which surveys were conducted, the project owner's qualified botanist shall submit a completion report documenting fulfillment of the target goals and which describe the number of new, previously undiscovered occurrences identified and mapped. Locations shall be reported

10. Security for Implementation of Plans: The project owner shall provide security adequate to fund implementation of the Special-Status Plant Protection and Monitoring Plan, the Special-Status Plant Remedial Action Plan for the life of the project, as well as the Seed Collection Plan, and the Gas Pipeline Revegetation Monitoring Plan.

Verification: No less than 30 days following the publication of the Energy Commission Decision the project owner shall submit final maps and design drawings depicting the location of Special-Status Plant Protection Areas within and adjacent to the project site, and shall identify the species and numbers of plants within each of the Special-Status Plant Protection Areas.

No less than 30 days following the publication of the Energy Commission Decision the project owner shall submit draft versions of the Special-Status Plant Protection and Monitoring Plan, the Special-Status Plant Remedial Action Plan, the Seed Collection Plan, and the Gas Pipeline Revegetation Monitoring Plan for review by the CPM, BLM's Authorized Agent, and CDFG. The project owner shall also provide a cost estimate for implementation of these plans which is subject to approval by the CPM, BLM's authorized agent, and the CDFG. The final plans shall be submitted for approval by the CPM, in consultation with BLM's Authorized Agent, CDFG, and CNPS within 90 days of the publication of the Commission Decision. The final plans shall be incorporated into the BRMIMP. At this time, the project owner shall also provide security sufficient to fund the implementation of the plans.

Within 30 days of the start of construction, the project owner shall submit copies of the contract with the CPM-approved seed contractor and the check for seed collection and curation fees to the CPM.

The project owner shall identify special-status plants occurrences within 250 feet of the project fence line during the pre-construction plant surveys described above. A qualified botanist shall delineate the boundaries of these special status plant occurrences at least 30 days prior to the initiation of ground disturbing activities.

On January 31st of each year following construction the project owner's qualified botanist shall submit a report, including CNDDB field survey forms, describing the results of off-site plant surveys to the BLM's authorized officer, the CPM, CDFG, and CNDDB. Submittal of survey reports shall continue until the same number of occurrences impacted by the project for small-flowered androstephium , Rusby's desert-mallow and Mojave milkweed are identified on these off-site lands as were impacted by the project. Similar reports shall be submitted for

desert pincushion, nine-awned pappus grass, and Parish's club-cholla for each of those species for which 75 percent avoidance was not achieved. For each of the species for which surveys were conducted, the project owner's qualified botanist shall submit a completion report documenting fulfillment of the target goals and which describe the number of new, previously undiscovered occurrences identified and mapped using GIS techniques for each species. Mapping results shall include GPS coordinates of the plants found.

The Designated Biologist shall maintain written and photographic records of the tasks described above, and summaries of these records shall be submitted along with the Monthly Compliance Reports to the CPM, BLM Authorized Agent, and CDFG. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report for a period not less than 10 years for the Gas Pipeline Revegetation Plan, and for the life of the project for the Special-Status Plant Protection and Monitoring Plan, and the Special-Status Plant Remedial Action Plan, including funding for the seed storage

Nelson's Bighorn sheep mitigation

BIO-19 To compensate for project impacts to Nelson's bighorn sheep the project owner shall finance, construct and manage an artificial water source in the eastern part of the Clark Mountain range or in the State Line Hills outside of designated Wilderness.

Verification: Within 60 days of publication of the Energy Commission Decision the project owner shall submit to the BLM's Authorized Officer, the CPM and CDFG a Draft Bighorn Sheep Mitigation Plan identifying a proposed location for the artificial water source and providing plans for its construction and management. At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide BLM's Authorized Officer and the CPM with the final version of the Bighorn Sheep Mitigation Plan that has been reviewed and approved by BLM, CDFG, and the Energy Commission staff. BLM's Authorized Officer and the CPM will determine the plan's acceptability within 30 days of receipt of the final plan.

No later than 18 months following the publication of the Energy Commission Decision, the project owner shall provide written verification to BLM's Authorized Officer and the CPM that the construction of the artificial water source has been completed. At the same time, the project owner shall provide evidence of an agreement (Memorandum of Understanding) and a funding mechanism to provide ongoing maintenance of the water source by CDFG or some other party approved by BLM's Authorized Office and the CPM.

Streambed Impact Minimization and Compensation Measures

BIO-20 The project owner shall implement the following measures to avoid, minimize and mitigate for impacts to ephemeral drainages:

1. Acquire Off-Site Desert Wash: The project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes

ephemeral washes with at least 198 acres of state jurisdictional waters. The terms and conditions of this acquisition or easement shall be as described in Condition of Certification **BIO-17** with the additional criteria that the desert wash mitigation lands: 1) include at least 198 acres of state jurisdictional waters; 2) be characterized by similar soil permeability, hydrological and biological functions as the impacted drainages; and 3) be within the same watershed as the impacted wash. The desert wash mitigation lands may be included with the desert tortoise mitigation lands ONLY if the above three criteria are met.

2. Security for Implementation of Mitigation: A security in the form of an irrevocable letter of credit, pledged savings account, or certificate of deposit for the amount of all mitigation measures pursuant to this condition of certification shall be submitted to, and approved by, the CPM, in consultation with CDFG, prior to commencing project activities within areas of CDFG jurisdiction. This amount shall be based on a cost estimate which shall be submitted to CDFG for review and to the CPM for approval within 60 days of the Energy Commission Decision's publication and prior to commencing project activities within areas of CDFG jurisdiction. The security shall be approved by the CPM, in consultation with CDFG's legal advisors, prior to its execution, and shall allow the CPM at its discretion to recover funds immediately if the CPM, in consultation with CDFG, determines there has been a default.

3. Preparation of Management Plan: The project owner shall submit to Energy Commission CPM and CDFG a draft Management Plan that reflects site-specific enhancement measures for the drainages on the acquired compensation lands. The objective of the Management Plan shall be to enhance the wildlife value of the drainages, and may include enhancement actions such as weed control, fencing to exclude livestock, or erosion control. No later than 12 months after publication of the Energy Commission Decision the project owner shall submit a final Management Plan for review and approval to the CPM and CDFG.

4. Right of Access and Review for Compliance Monitoring: The CPM reserves the right to enter the project site or allow CDFG to enter the project site at any time to ensure compliance with these conditions. The project owner herein grants to the CPM and to CDFG employees and/or their representatives the right to enter the project site at any time, to ensure compliance with the terms and conditions and/or to determine the impacts of storm events, maintenance activities, or other actions that might affect the restoration and revegetation efforts. The CPM and CDFG may, at

the CPM's discretion, review relevant documents maintained by the operator, interview the operator's employees and agents, inspect the work site, and take other actions to assess compliance with or effectiveness of mitigation measures.

5. Notification: The project owner shall notify the CPM and CDFG, in writing, at least five days prior to initiation of project activities in jurisdictional areas as noted and at least five days prior to completion of project activities in jurisdictional areas. The project owner shall notify the CPM and CDFG of any change of conditions to the project, the jurisdictional impacts, or the mitigation efforts, if the conditions at the site of a proposed project change in a manner which changes risk to biological resources that may be substantially adversely affected by the proposed project. The notifying report shall be provided to the CPM and CDFG no later than seven days after the change of conditions is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a project; the biological and physical characteristics of a project area; or the laws or regulations pertinent to the project as defined below. A copy of the notifying change of conditions report shall be included in the annual reports.

   a. Biological Conditions: a change in biological conditions includes, but is not limited to, the following: 1) the presence of biological resources within or adjacent to the project area, whether native or non-native, not previously known to occur in the area; or 2) the presence of biological resources within or adjacent to the project area, whether native or non-native, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

   b. Physical Conditions: a change in physical conditions includes, but is not limited to, the following: 1) a change in the morphology of a river, stream, or lake, such as the lowering of a bed or scouring of a bank, or changes in stream form and configuration caused by storm events; 2) the movement of a river or stream channel to a different location; 3) a reduction of or other change in vegetation on the bed, channel, or bank of a drainage, or 4) changes to the hydrologic regime such as fluctuations in the timing or volume of water flows in a river or stream.

   c. Legal Conditions: a change in legal conditions includes, but is not limited to, a change in Regulations, Statutory Law, a Judicial or Court decision, or the listing of a species, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

6. Code of Regulations: The project owner shall provide a copy of the Streambed Impact Minimization and Compensation Measures from the Energy Commission Decision to all contractors, subcontractors, and the applicant's project supervisors. Copies shall be readily available at work sites at all times during periods of active work and must be presented to any CDFG personnel or personnel from another agency upon demand. The CPM reserves the right to issue a stop work order or allow CDFG to issue a stop work order after giving notice to the project owner, the CPM, if the CPM in consultation with CDFG, determines that the project owner has breached any of the terms or conditions or for other reasons, including but not limited to the following:

   a. The information provided by the applicant regarding streambed alteration is incomplete or inaccurate;

   b. New information becomes available that was not known to it in preparing the terms and conditions;

   c. The project or project activities as described in the Final Staff Assessment have changed; or

   d. The conditions affecting biological resources changed or the CPM, in consultation with CDFG, determines that project activities will result in a substantial adverse effect on the environment.

7. Best Management Practices: The project owner shall also comply with the following conditions:

   a. The project owner shall minimize road building, construction activities and vegetation clearing within ephemeral drainages to the extent feasible.

   b. The project owner shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter ephemeral drainages or be placed in locations that may be subjected to high storm flows.

   c. The project owner shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws, and it shall be the responsibility of the project owner to ensure compliance.

   d. Spoil sites shall not be located within drainages or locations that may be subjected to high storm flows, where spoil shall be washed back into a drainage.

e. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, shall be prevented from contaminating the soil and/or entering waters of the state. These materials, placed within or where they may enter a drainage or Ivanpah Dry Lake, by project owner or any party working under contract or with the permission of the project owner shall be removed immediately.

f. No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the state.

g. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any drainage.

h. No equipment maintenance shall occur within 150 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.

Verification: No less than 90 days prior to acquisition of the parcel (s) containing 198 acres of waters of the state, the project owner, or a third-party approved by the CPM, in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase.

Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage compensation lands shall be submitted to Energy Commission staff for review and approval (in consultation with CDFG) prior to land acquisition. Such agreements shall be mutually approved and executed at least 60 days prior to start of any project-related ground disturbance activities. The project owner shall provide written verification to the CPM that the compensation lands have been acquired and recorded in favor of the approved recipient(s). Alternatively, before beginning project ground-disturbing activities, the project owner shall provide Security in accordance with this condition. Within 90 days after the land purchase, as determined by the date on the title, the project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, for the compensation lands and associated funds.

No fewer than 30 days prior to the start of work potentially affecting waters of the state, the project owner shall provide written verification (i.e., through incorporation into the BRMIMP) to the CPM that the above best management practices will be implemented and provide a discussion of work in waters of the state in Compliance Reports for the duration of the project.

BIOLOGICAL RESOURCES APPENDIX B

Issues to Address in the Closure, Revegetation and Rehabilitation Plan

The *Closure, Revegetation and Rehabilitation Plan for the Ivanpah Solar Electric Generating System, Eastern Mojave Desert, San Bernardino County, California*, June 2009 (CH2M Hill 2009q) has been reviewed and the following issues need to be addressed in revisions to this document.

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.
Based on 2009-06-29_Applicant_Data_Response_Set_2K_TN-52208 (Data_Response_Set_2K).

Policies

General

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Reference in Data_Response_Set_2K:

Approach: Key future actions will be cut and pasted with “will” substituted for might, should, etc.

Proposed Wording of Condition: future actions will be cut and pasted with “will” substituted for might, should, etc.

End use of the ROW after ISEGS closure

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Vague language

Reference in Data_Response_Set_2K: 1.1

Approach: The end use of the property 50 years from now is quality habitat of the types impacted by construction and operation. Contracts and permits may be amended by mutual agreement, but the current standards conform to laws and guidelines now in effect.

Proposed Wording of Condition: The objective of the revegetation plan and all related activities shall be re-creation of the types of habitat lost during

construction and operation of the proposed solar energy facility. No project approvals will be issued, nor shall any plans or applications be based on other potential end uses of the property.

Shading from Mirrors

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Reference in Data_Response_Set_2K: This topic is not discussed in the draft.

Approach: Point out that shading from the mirrors is serious and can lead to competitive disadvantages to plants with the crassulacean acid metabolism photosynthetic pathway (CAM).

Proposed Wording of Condition: The fraction of the land surface that is to be occupied by mirrors will have an impact on the vegetation. Shading has selective effects on wavelengths of light that are critical to desert plants that have crassulacean acid metabolism (CAM). These plants include many succulents. Shading will inhibit growth and reduce competitive ability of CAM plant species and is considered an impact under these Conditions of Approval. Native CAM plant species that are subject to shading will be moved to a succulent storage area or an unshaded portion of the operations area. Under no circumstances shall salvaged succulents be stored within Special-Status Plant Protection Areas. Any such moves of CAM plants not already approved under other Conditions of Approval shall be specifically verified in writing by BLM or its designated representative.

Submittal of final closure, revegetation, and rehabilitation plan

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Vague language

Reference in Data_Response_Set_2K: 7.1

Approach: Specify the importance of the final plan.

Proposed Wording of Condition: The Final Closure, Revegetation, and Rehabilitation Plan (final closure plan) shall be submitted and approved by BLM prior to issuance of the permit.

Standards

Introduction of mid to late successional vegetation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: the argument against introduction of late stages of succession during the restoration effort.

Reference in Data_Response_Set_2K: 7.3.1

Approach: Draw upon examples in which later stages of succession have been introduced, and provide standards to assure an effort to introduce plants other than ruderals.

Proposed Wording of Condition: Later stages of vegetation are not impossible to establish, and late successional species can be introduced at the same time as early stage species. Late stage species are often more dependent upon soil biological conditions and soil structure but can be successful in a mixture with early stage species. Performance standards

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: The low threshold being proposed for project success in Data_Response_Set_2K. Performance standards currently proposed by the Applicant will not define a successful restoration project.

Reference in Data_Response_Set_2K: 7.8.1, Table 7-6

Approach: Specific and more stringent standards for project success;

Proposed Wording of Condition: Within each mapped pre-disturbance vegetation type, success criteria will be achieved as defined by performance and abundance of native and exotic plant species. Native plants in the vegetation shall reach over the first 10 years of growth 80 percent of the initial density, absolute cover, and species richness, with progressive improvement during the 10-year period. Exotic species shall reach over the first 10 years of growth no more than 4 times the absolute cover of exotic plants in the original vegetation. Every effort shall be made to minimize invasion by exotic species, and the performance standards shall include a maximum allowable cover of exotic species.

Standard for weed Cover

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Lax weed cover standards

Reference in Data_Response_Set_2K: 3.5.3 and 7.3.1.1

Approach: Reduce tolerance for weedy species in the revegetation effort

Proposed Wording of Condition: The vegetation to be introduced to the site shall consist entirely of plant species native to the northern Mojave Desert. No exotic plant species shall be included on the seed lists nor introduced with native species. Exotic species, regardless of their presence in the original vegetation, shall not be counted as successful vegetation establishment.

Monitoring

Baseline vegetation surveys

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Restoration surveys are not suitable for planning the restoration effort.

Reference in Data_Response_Set_2K: 3.5.4

Approach: Requirement for vegetation surveys that can guide restoration planning. There will have to be thorough sampling within each vegetation type. The current plan provides fewer transects than there are vegetation types.

Proposed Wording of Condition: Pre-construction surveys of all vegetation on the subject sites shall be carried out in a manner able to guide restoration efforts and provide baseline measurements for judging project success. The entire proposed project area shall be divided into vegetation types as described by Sawyer and Keeler-Wolf. The boundaries of each vegetation type shall be mapped to GPS accuracy of one meter or less and provided to BLM as a series of shape files. Each vegetation type will have soil, terrain, exposure, elevation, and slope clearly indicated. For each vegetation type provide a list of perennials and appropriate annuals. Surveys shall be performed at a season when the year's annuals are identifiable; generally from early March through late April. Survey methodology should emphasize accuracy rather than precision. Generally it is preferred to record a large number of rapid determinations rather than a small number of detailed determinations. BLM will accept rapid methods such as

the step-point method (Bonham 1988) provided transects are laid out in a manner that captures the true composition of the vegetation. The combined length of step-point transects in each vegetation type shall approximate the square root of the area of the vegetation type or at least 400 intercepts and shall be laid out to give unbiased representation of all portions of the vegetation type. Vegetation need not be divided into herb and shrub layers as long as all species intercepted by points are included in the survey. Additional species not encountered on the transects shall be recorded separately on a diversity list.

Maintenance monitoring schedule

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Maintenance monitoring schedule must be frequent during early stages

Reference in Data_Response_Set_2K: 7.8.2.1

Approach: Monitoring. Performance standards currently proposed by the applicant will not define a successful restoration project.

Proposed Wording of Condition: Maintenance monitoring shall include visual inspection of all planting areas with brief e-mail reports to the applicant and all involved agencies. Monitoring shall be scheduled once per month during the first growing season after seed application, switching to once per quarter starting in July after seed application. Monitoring may be reduced to once per year in late March through mid May of each year after the second growing season.

Performance monitoring methods

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Performance standards currently proposed by the applicant will not define a successful restoration project.

Reference in Data_Response_Set_2K: 7.8.2

Approach: Methods and schedule for performance monitoring

Proposed Wording of Condition: Performance monitoring shall be conducted annually during the spring flowering season, between mid March and mid May to assess restoration performance. Performance monitoring surveys of all vegetation on the subject sites shall be carried out in a manner able to detect project success. The entire proposed project area shall be divided into vegetation

types as described by Sawyer and Keeler-Wolf. The boundaries of each vegetation type shall be compared with the baseline survey maps, and if the boundaries have changed the maps shall be updated and provided to BLM as a series of shape files. Each vegetation type will have soil, terrain, exposure, elevation, and slope clearly indicated. For each vegetation type provide a list of perennials and appropriate annuals. Surveys shall be performed at a season when the year's annuals are identifiable; generally from early March through late April. Survey methodology should emphasize accuracy rather than precision. Generally it is preferred to record a large number of rapid determinations rather than a small number of detailed determinations. BLM will accept rapid methods such as the step-point method (Bonham 1988) provided transects are laid out in a manner that captures the true composition of the vegetation. The combined length of step-point transects in each vegetation type shall approximate the square root of the area of the vegetation type or at least 400 intercepts and shall be laid out to give unbiased representation of all portions of the vegetation type. Vegetation need not be divided into herb and shrub layers as long as all species intercepted by points are included in the survey. Additional species not encountered on the transects shall be recorded separately on a diversity list.

Transplants

Records of succulent transplantation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Lack of specificity on size and age of succulents to be transplanted.

Reference in Data_Response_Set_2K: 4.5

Approach: Present a table that shows by species the number of plants onsite, the lower threshold height for salvage, the number in each size class, and the fate of plants not salvaged.

Proposed Wording of Condition: Each area to be cleared or mowed under this application shall be surveyed in detail, and every succulent shall be inventoried and mapped. Applicant shall provide prior to breaking ground a table showing for each plant the species, height, UTM coordinates to an accuracy of one meter or less, and expected disposition of the specimen. Height above ground level shall be provided in the table. Separate height criteria will be agreed with BLM for each species of succulent. In no case shall the height criterion exclude all or most of a species, as would happen with a uniform criterion of one foot.

Succulent transplantation research

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Research responsibilities not adequately addressed

Reference in Data_Response_Set_2K: 1.3.4

Approach: Ivanpah 1 subject to experimental evaluation for methods to be used on Ivanpah 2 and 3.

Proposed Wording of Condition: Succulent transplants done during preparation of the Ivanpah 1 site shall be fully documented and shall serve as trials of methods to be used during plant salvage on the Ivanpah 2 and 3 areas. Full records shall be available immediately upon request of BLM or their designated representatives and shall contain for each transplanted specimen the species, height, number of branches or pads as appropriate, donor location by UTM coordinates, methods used to remove, transport and store the plant, period of temporary storage, location, facility description and planting medium used for storage, and frequency of watering during storage. The records shall include plant condition at the time of collection, at the time of planting at the storage area, and quarterly during storage until such time as each plant is sold, placed in the field, or dies. No salvaged individuals of desert pincushion or Parish's club-cholla shall be sold to the public. These individuals shall be carefully collected and handled in accordance with the Special-Status Plant Remedial Action Plan.

Clearing

Clearing of vegetation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Contradictory wording about extent of clearing.

Reference in Data_Response_Set_2K: 1.3.1, 1.3.2

Approach: No general clearing of vegetation will be carried out as stated in 1.3.2. Instead, 1.3.1 will apply.

Proposed Wording of Condition: Clearing of vegetation shall be limited to areas for which final maps are provided to BLM before approval of the ROW. Clearing of vegetation will be permitted on roads, utility routes, building and

parking areas, and temporary staging areas provided these are specifically documented on a georeferenced aerial photo or shape file, showing the exact locations of soil disturbance. BLM will consider relocating specific installations prior to the beginning of construction but will not approve additional acreage under the current application.

Locations for mowing of vegetation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Contradictory wording about extent of clearing.

Reference in Data_Response_Set_2K: 1.3.2 and 2.2.1

Approach: Mowing limited to pre-defined and agreed areas.

Proposed Wording of Condition: Vegetation within the operations area may be mowed within agreed and pre-defined limits as required for access and operation. The pre-defined limits for mowing shall be specifically documented on a georeferenced aerial photo or shape file, showing the exact locations of proposed mowing. BLM will consider relocating the boundaries of the mowed areas prior to the beginning of construction but will not approve additional acreage under the current application.

Methods for mowing vegetation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Contradictory wording about extent of clearing.

Reference in Data_Response_Set_2K: 1.3.2

Approach: Methods and height of mowing.

Proposed Wording of Condition: Mowing may be carried out only by hand-operated string trimmers or tractor-mounted flail or rotary mowers. Tractors operated within native vegetation shall be provided with low ground pressure tires. The height of the mowing blade shall be at least 15 inches.

Planting

Seed collection

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Seed collection procedures

Reference in Data_Response_Set_2K: 7.3.1.4

Approach: Range of species, collect from all to be destroyed.

Proposed Wording of Condition: Seed collection shall be carried out within an area mapped and provided to BLM with the project application. Special-status plant seed shall be separated from other native plant seed and handled according to the Special-Status Plant Remedial Action Plan.Future changes in seed collection area shall be negotiated separately with BLM. Collection areas shall be within 10 miles of the boundaries of the project site and shall be on similar terrain, soil, exposure, slope and elevation to the project site. Seed collection guidelines shall conform to all laws and regulations in effect at the time of collection and shall follow the guidelines for native seed collection provided by California Native Plant Society. Seed collection shall include all plant species known to be removed by construction and operation of the facility. If insufficient seeds are provided by "seed farming" and collection within 10 miles of the site, BLM may approve collection from a greater distance provided other environmental factors at the collection site are good matches to the project site.

Seed testing

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Restoration Methods

Reference in Data_Response_Set_2K: 7.3.1.4, Table 7-1, 7.3.3.2

Approach: Seed testing

Proposed Wording of Condition: Batches of seeds collected or produced for this project shall be tested by a certified seed testing laboratory that will provide for each batch of seeds determinations of purity, germination, and seed count. Seed not sorted by plant species, including collections from under shrubs, from depressions in the soil, and from harvester ant caches, may be used to supplement defined seed batches but shall not be included in the claim of known seed applications.

Seed application

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Restoration Methods

Reference in Data_Response_Set_2K: 7.4.1

Approach: Seed application by methods that provide good soil contact and protection from granivores. Information about the imprinting process and model specifications for imprinting contracts are available in St. John and Dixon (1996).

Proposed Wording of Condition: Seed shall be applied by methods that provide good seed-soil contact. The most successful methods in similar conditions are land imprinting or broadcasting followed by a roller that will press seeds into the soil but not cause heavy compaction. Contrary to opinions expressed in the current application document, imprinting has often worked well on sandy loams and even pure sand. A communication to this effect is provided in an appendix from Dr. Robert Dixon, inventor of the land imprinter. Any imprinter must meet be able to form continuous imprints with two-inch berms between micro-watersheds of one square foot. Machines making imprints on only a small fraction of the soil surface shall not be substituted for Dixon imprinter. Pitting may be acceptable by agreement with BLM, with seed drilling a potential but not preferred choice.

Soil preparation

Soil description

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Vague language

Reference in Data_Response_Set_2K: 7.2.5.1

Approach: Exact contents of soil baseline characterization

Proposed Wording of Condition: A soil baseline characterization shall be conducted before ground is broken at the proposed site. The characterization shall include:

a. Profile description of three representative pedons. (A pedon is the smallest three dimensional sampling unit displaying the full range of characteristics of a particular soil and typically occupies an area ranging from about 1 to 10 square yards [Brady and Weil, 2002]).

b. Characterization of surface condition (that is, is desert pavement or cryptogamic crust present). Description of cryptogamic crust shall include major groups of organisms identified at the site (filamentous cyanobacteria, other cyanobacteria, mosses, lichens, liverworts) and the characteristics by which they were identified. No identification shall be required apart from the general list presented in this paragraph.

c. Documentation of soil macro-invertebrates (that is, presence of ants, termites, and other significant macro-invertebrates)

d. Soil texture (that is, percent sand, silt, and clay), along with a reference to a widely accepted method for making the determination.

e. Bulk density, along with a reference to a generally accepted method for making the determination.

f. Fertility (that is, nutrient status, electrical conductivity, sodium adsorption ratio), along with methods by which composite samples were collected and the laboratory methods used to determine these properties. Composite samples shall contain equal contributions from at least six randomly-located collection points within the soil donor area.

g. Organic matter content and total carbon and nitrogen content, along with a reference to generally accepted methods for making the determinations.

Soil compaction shall be determined by measurement of bulk density in grams per cubic centimeter (or numerically equivalent units). Bulk density may be determined by any of several standard measurements, but the method used must be referenced to a widely-accepted soil methodology publication. In no case shall soil be compacted to bulk density that exceeds 1.6 g/cc except where no planting is to take place. Penetrometer measurements are not a substitute for bulk density measurements.

Mulch application

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Mulch application has potential disadvantages as well as advantages.

Reference in Data_Response_Set_2K: 7.4.2

Approach: Mulch application is rarely done in this kind of restoration effort, but it could be beneficial.

Proposed Wording of Condition: Mulch application is done at the option of the operator. Mulch application to the soil shall consist of local non-weedy materials, the collection of which is incidental to other activities onsite. In no case shall mowing or grading of native vegetation be carried out for the sole purpose of generating mulch. Mulch shall be applied only to the soil surface unless the soil has already been inverted or severely disturbed through other procedures. Materials of relatively high nitrogen content, including alfalfa hay, shall not be applied.

Soil storage

Topsoil collection and storage

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Restoration Methods

Reference in Data_Response_Set_2K: 7.2.3

Approach: Require certain stockpiling procedures

Proposed Wording of Condition: Topsoil for this project shall be defined as the soil volume from the original surface to 8 inches in depth. The upper 1/4 inch may be collected separately to preserve biological crust organisms as prescribed elsewhere in these Conditions of Approval. Topsoil may not be distinguishable by color or organic content but will have most fine roots during the active growing season. Topsoil shall be stored at locations agreed to by BLM and designated for this purpose. All stockpiles shall be on ground previously disturbed for another purpose, such as roads no longer in use. If no disturbed location is available for topsoil storage, applicant will propose locations for BLM approval, then add the material on top of native vegetation at the agreed locations. Soil shall be collected, transported, and formed into stockpiles only while the soil is dry. The vegetation in place at or immediately before topsoil collection will be healthy native vegetation with less than 15 percent absolute cover of exotic weed growth. Soil occupied by vegetation of high plant diversity shall be given priority over soil occupied by low diversity native vegetation. Soil may be collected with a front loader, bulldozer, or scraper and transported to storage areas by front loader, dump truck, or scraper. The equipment transporting the soil shall not travel across the stockpile more than the minimum number of times required to build the soil to its intended depth. If transported in scrapers, the equipment shall travel new paths at each crossing to minimize the compaction of previous layers. The depth of the stockpiles shall not exceed 4 feet in the case of sandy loam or loamy sand soils. Topsoil stockpiles shall be kept dry and covered if no vegetation is introduced, but covers shall not be allowed to promote greenhouse heating of the stockpiles. If native vegetation is grown on the stockpiles to

increase seeds and soil organisms, no cover shall be required. Artificial watering may be provided at the operator's option.
Stored topsoil may be reapplied as a layer over decompacted subgrade material as a means of implementing the restoration program. The topsoil layer shall be a minimum of 3 inches in depth. In general, topsoil may be applied to about twice the land area from which it was removed. The topsoil layer shall be bonded to the subgrade with a lightly-loaded sheepsfoot roller, a land imprinter, or other implement that interlocks material from the two layers without causing bulk density in excess of 1.6 grams per cubic centimeter. Seeds may be distributed concurrently with layer bonding if a land imprinter is employed for both purposes.

Seed farming

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Unproductive uses of topsoil stockpiles under current proposal.

Reference in Data_Response_Set_2K: 7.2.3, 7.3.1.4

Approach: Seed farming

Proposed Wording of Condition: Topsoil to be stockpiled under other provisions of these conditions shall be used to grow native plant species for the purpose of producing native seeds and building beneficial microorganisms in the soil volume. All native plant species encountered in the vegetation surveys shall be in the growing rotation on the stockpiles. Most growing space shall be dedicated to the species for which the most seeds will be required. At least half by area of the growing area during each growing cycle shall be dedicated to plant species known to be good mycorrhizal host plants. These are often fast-growing, short-lived perennial grasses and composites, although representatives of many other plant families may be mycorrhizal hosts as well. Members of the families Chenopodiaceae and Amaranthaceae shall be limited to less than half the area of the soil stockpiles, with the other half occupied by known mycorrhizal host plant species.

Soil biology

Mycorrhizal inoculation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Document contains no specificity about mycorrhizal inoculation.

Reference in Data_Response_Set_2K: 6.2.3

Approach: Give plant species, locations, inoculation methods, sources of inoculum, and methods of application.

Proposed Wording of Condition: Mycorrhizal inoculation shall be carried out in all planting areas having fewer than one spore per cubic centimeter of topsoil, where topsoil is defined as soil between the surface and 8 inches depth, or to bedrock if the soil is less than 8 inches in depth. Spore counts shall be carried out by methods given in Johnson et al. or other accepted methodology as approved by the BLM project manager or his designated representative. Inoculation shall result in a minimum of one spore per cubic centimeter of soil as defined for initial spore counts. No inoculation shall be required in areas where the operator is able to demonstrate that all plant species on the list of final desired vegetation are known to be non-host species. This condition might be found in saline or very alkaline soils.

Biological crust collection and storage

Proposed Conditions of Approval for ISEGS

Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: The lack of attention to soil biological crust in a setting where it should be present and should be restored.

Reference in Data_Response_Set_2K: 7.2

Approach: Point out the role of soil biological crust in protecting the soil and holding weeds at bay, and require that key components of the soil crust be restored.

Proposed Wording of Condition: Soil biological crust is defined here as a mixture of organisms that occupy and protect the surface of the soil in most desert ecosystems. The organisms often include filamentous and non-filamentous cyanobacteria, mosses, lichens, liverworts and fungi. Soil biological crust shall be preserved by collecting the upper 1/4 inch of topsoil from areas to be graded. Applicant may flag specific areas known to contain biological crust organisms or collect upper soil from the entire area. BLM or its designated representative must concur that the correct areas have been flagged if collections are to include less than the entire area over which the soil surface will be disturbed. Collections are to emphasize filamentous cyanobacteria; but other cyanobacteria, mosses, lichens, and liverworts are also considered valuable contributors to the soil biological crust and will be important in protecting against erosion and reducing weed invasion. Soil surface crust shall be air dried and stored dry in a shaded location in containers that allow air movement, such as

loose-weave fabric bags. In no case shall the stored crust be subject to wetting or direct sunlight during storage. All containers shall be clearly labeled with date and location of original collection; name and contact information of persons responsible for identifying suitable material to collect; and the persons who collected, stored, and maintained collections.

Soil biological crust shall be re-applied at the time of replanting by crumbling the stored material and broadcasting it on the surface of the soil. Stored crust material may be applied to an area up to 10 times the area from which it was collected. Approximately 10 percent of the stored material shall be broadcast on topsoil storage areas among plants being grown for seed and soil microorganisms. When the growing cycle progresses to new planting, the soil supporting biological crust shall be collected and stored by the same methods prescribed for collections from the original soil, in clearly labeled bags or other suitable containers.

Weed management

Mirror wash water

Proposed Conditions of Approval for ISEGS

Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Moisture from washing mirrors is not adequately addressed

Reference in Data_Response_Set_2K: 5.3

Approach: Wash water may very well cause weed growth and root diseases of nearby native plants.

Proposed Wording of Condition: Even though mirror washing will be infrequent, evaporation will not be certain to remove moisture from soil. Washing will be done at night and throughout the calendar year and is likely to collect in the upper soil at least locally. Stored moisture can support vigorous weed growth and will present a risk for root disease in nearby native plants that are adapted for soil that is usually dry. All weed growth brought on by mirror washing shall be controlled by trimming the weeds to less than six inches in height. Any native succulents or plant species of concern within the drainage area of mirror washing will be monitored quarterly. If wilting or other signs of stress occur, the plants will be moved to an unshaded portion of the operations area. Any such moves of plants not already approved under other Conditions of Approval shall be specifically verified in writing by BLM or its designated representative.

B. SOIL AND WATER RESOURCES

This section focuses on the soil and water resources associated with the Ivanpah Solar Electric Generating System (ISEGS), including the project's potential to induce erosion and sedimentation, adversely affect water supplies, and degrade water quality. Mitigation measures are included in the Conditions of Certification to ensure that the project will have no significant impacts on the environment and that it will comply with all LORS.

SUMMARY AND DISCUSSION OF THE EVIDENCE

The ISEGS project would be located in the Ivanpah Valley, approximately 560,000 acres in size, in the eastern Mojave Desert in San Bernardino County, California, near the California/Nevada border (Soil & Water Figure 1). This part of the Mojave Desert is federal land administered by the BLM. Water resources in this area are extremely limited and vegetation sparse. Due to these limitations, there is a need for a higher degree of water use management and additional protection against accelerated soil erosion.

The Ivanpah Valley extends across the California state line and into Nevada and is part of a larger hydrologic system that includes Jean Lake Valley. Precipitation in the surrounding mountains provides the Ivanpah Valley with water. Surface water runoff of mountain precipitation flows through washes and discharges to and infiltrates into the alluvium-filled valley. The Ivanpah Valley is topographically closed. Excess surface flow drains to the Ivanpah, Roach, and Jean Dry Lakes where it evaporates and leaves behind a hard lakebed (desert playa), now a world-class land sailing location due to the topographic flatness of the playa and high winds that can develop in this area.

Groundwater is the primary natural water supply for the valley region. At the proposed project location, depth to groundwater appears to vary from approximately 215 to 715 feet below ground surface (bgs), with depth increasing upslope along the alluvial fan. The storage capacity on the California side of the valley of the Ivanpah Valley Groundwater Basin (IVGB) is estimated to be 3.09 million acre-feet (AF). The storage capacity on the Nevada side of the basin has not been estimated.

Precipitation supplies water to the basin, primarily by infiltration of mountain runoff across the alluvial deposits and through ephemeral washes. Recharge from precipitation on the valley floor is minimal. When runoff or precipitation

does reach the dry lakes, infiltration to groundwater is negligible and most of the water is removed by evaporation. Groundwater discharge from the basin occurs mainly through pumping and underflow towards the Las Vegas Valley.

The Ivanpah and Roach playas may seasonally contain surface water, but there are no perennial surface flows to these playas. During infrequent heavy rains, storm water eventually drains across the alluvial fans to the playas. Surface desiccation cracks are present in the Ivanpah playa, and large desiccation cracks may be located below the surface that cause sinkholes to develop. Seasonal springs are present along the base of the Clark Mountains, up slope and hydraulically upgradient from the proposed project site. These springs occur in areas of consolidated rock and are estimated to flow at a rate of no more than 5 gallons per minute (gpm). The discharge from the springs is inadequate to sustain surface flow for a substantial distance.

The natural groundwater quality varies widely. Elevated concentrations of fluoride and sodium occur in parts of the basin. In the vicinity of the Ivanpah playa, the groundwater is saltier and characterized as sodium chloride. Total dissolved solids (TDS) in the basin range from 300 to 500 milligrams per liter (mg/l), and can be as high as 7,702 and 27,501 mg/l in the vicinity of Ivanpah playa and in the northern part of the basin. TDS at the project site is estimated to be between 369 to 600 mg/l, based on water samples from Colosseum Wells # 1 and #2 located near the proposed project site.

Molycorp Mine (aka Mountain Pass Mine) discharged wastewater through a pipeline to 'old' evaporation ponds in the Ivanpah playa between 1980 to 1987, and later discharged wastewater to 'new' evaporation ponds in the playa from 1988 to 1998. Regional Water Quality Control Board (RWQCB) Cleanup and Abatement Order No. 6-98-20 requires abatement of a groundwater plume that developed beneath the old evaporation ponds. The plume contains TDS, nitrate, strontium, barium, and radium in concentrations above the California Maximum Contaminant Levels (MCLs). Sediments at both ponds contain lanthanides and radionuclides. Most of the non-natural contamination in the groundwater basin is the result of discharge to these ponds. (Ex. 300, pp. 6.9-6 – 6.9-8.)

1. Storm Water

The existing storm water flow across the project site is generally towards the east across an alluvial fan that has developed in conjunction with the uplift and erosion of the Clark Mountains. Storm water is conveyed across the fan as sheet

flow and through numerous ephemeral wash channels, and can reach the Ivanpah playa during heavy rain events. During major storm events, the ephemeral washes can flow for periods of a few hours to 24-hours with the possibility of flash floods and mass wasting. The ephemeral washes on the alluvial fan have been determined to be non-jurisdictional features by the Army Corps of Engineers under Section 404 of the Clean Water Act and are, therefore, Waters of the State. (Ex. 300, p. 6.9-11.)

A total of 1,726 ephemeral washes were mapped in the project area and were categorized by the applicant on the basis of width. A summary of this categorization is presented below in Soil and Water Resources Table 1.

SOIL & WATER RESOURCES Table 1
Summary of Ephemeral Washes at the Proposed Project Site
(All Washes Classified as Waters of the State)

Wash Category and Width	Number of Ephemeral Washes Mapped						
	Ivanpah 1	Ivanpah 2	Ivanpah 3	Utility Corridor	Colosseum Road	Substation and Admin. Area	Total
Category 1 36 to 85 feet	0	2	1	0	0	0	3
Category 2 21 to 35 feet	0	4	3	1	0	0	8
Category 3 11 to 20 feet	10	22	15	8	9	10	74
Category 4 5 to 10 feet	95	130	107	16	11	19	378
Category 5 1 to 4 feet	397	292	358	29	36	151	1263
						Total	**1,726**

Source: Ex. 88, pp. 3-1- -- 3-11.

Not all of the washes appear to be active and storm water flow likely migrates from one wash to create a new wash over time. No other wetlands or waters were identified at the project site.

The project site is located in Federal Emergency Management Agency (FEMA) Zone D, which is classified as areas with possible flood hazards. Although a flood hazard analysis has not yet been conducted by FEMA for this area, a hydrologic study and modeling have been completed by the applicant. This work indicates that the alluvial fan has both active and inactive areas that can be subject to intense storm water flows. Storm water flow across the active portion of the fan comes from runoff originating in the Clark Mountain sub-watersheds above the alluvial fan and from runoff originating on the alluvial fan itself. Fifteen sub-watersheds, totaling 13,900 acres, were estimated to be contributing to storm water flows that could affect the proposed project. (Ex. 300, p. 6.9-11 – 6.9-13.)

2. Soil and Erosion

The Natural Resources Conservation Service classifies soils at the project sites as Arizo loamy sand and Popups sandy loam. According to the Unified Soils Classification System (USCS), the soils are clayey, silty sands (SC-SM) and silty, sandy gravels (GM). The Arizo loamy sand is excessively well drained and the Popups sandy loam is well drained. Development activities, including compaction associated with vehicle access, grading (in limited areas), removal of vegetation, and modification of precipitation patterns would generally result in reducing soil infiltration rates, and increasing the volume and velocity of runoff associated with storm events. If used, soil binders would also tend to reduce the soil infiltration rate.

To reduce the impact of these development activities on infiltration and runoff, the applicant proposes to implement low impact development (LID) methods. The goal of LID is to maintain the function and value of the natural drainage system while minimizing the risk of accelerated soil erosion and increased storm water runoff. By using the naturally developed drainage features and patterns, LID designs can reduce storm water infrastructure construction and long-term maintenance costs. Towards this end, the applicant has proposed the following methods:

Vegetation. During construction, existing vegetation and plant roots would be left in place to the extent possible and cut only as necessary to allow clear movement of the heliostats. Native plants would be allowed to grow so long as their growth did not interfere with the heliostat operation or maintenance. An herbicide would be used to eradicate noxious weeds and non-native species.

Grading. Natural drainage features would be maintained to the extent possible. Grading would be designed to maintain natural sheet flow as much as practicable. Fill required in the heliostat fields would be compacted to closely match existing compaction, infiltration, and permeability. Hydro-mulch and soil binding and weighting agents would be used to protect areas disturbed by grading.

Even with these LID methods employed, project development would likely have effects that result in reduced storm water infiltration and increased runoff. Although grading would be minimized to the extent necessary, the project would

still cut, move, and reuse an amount less than 135,000 cubic yards[1] of soil in Ivanpah 3. An additional 110,000 cubic yards would be cut and moved through the remainder of the project. To minimize these impacts, all soil cut would be reused onsite. Approximately 412,600 cubic yards of vegetation would be cut, mulched, and used in erosion control.

Roads and Pathways. Access roads would be graded to follow existing topography. Ungraded maintenance pathways would be used to maintain and wash the heliostats. Vehicles designed to minimize soil compaction would be used. The vehicles conducting the heliostat washing would travel at less than 10 mph to minimize dust generation. For additional information on dust management, please refer to the Air Quality section

Potable Water. During project construction, potable (primarily drinking) water would be provided by construction contractors and purchased from an offsite source. During plant operation, potable water would either be brought into the project from a delivery service or pumped from one of the on-site groundwater wells and filtered and purified to meet the project's workforce potable water needs. The estimated annual potable water demand during plant operation is approximately 3 acre-feet for all three project phases. (Ex. 300, pp. 6.9-13 – 6.9-14.)

Project Water Supply. All water for the construction and operation of the power plants would be drawn from one of two wells located on the northwest corner of Ivanpah 1. One well would be used as the primary water supply with the other well used as a backup for redundancy. A monitoring well would be installed approximately 2,300 feet northeast of the project's wells to monitor project impacts to local groundwater levels. Pumped water would be stored for each power block in a 250,000 gallon combined raw water and fire water tank.

Construction of each phase of the proposed project is expected to take 24 months. Groundwater would be used daily for dust suppression and vehicle washing. Average daily water demand during construction is 99,333 gallons per day (gpd) for Ivanpah 1 and 2 and 194,000 gpd for Ivanpah 3. During hydrostatic testing of the project piping, up to 47,000 gallons of water could be used. The

[1] This estimate is for the project as originally analyzed in the FSA/DEIS. (Ex. 300, p. 6.9-13.) The Mitigated Ivanpah 3 proposal removed much of the portion of Ivanpah 3 where heavy grading would be necessary and is therefore predicted to result in a lower amount of soil removal and relocation. The footprint of Ivanpah 3 is reduced by 433 acres, the construction logistics area by 109 acres and the area in Ivanpah 3 requiring heavy grading due the presence of large boulders from 170 to 20 acres. (Ex. 315, p. 6-1.) However, a more precise estimate of the quantity of affected soil was not provided in the evidence.

used water from this testing would either be trucked to a wastewater treatment and disposal facility or allowed to percolate/evaporate on-site, pending analytical results of the used water. If discharged to land, discharge of this water would be subject to the requirements of the State Water Resources Control Board's general permit number 2003-003-DWQ.

The Applicant estimates the combined maximum annual use of groundwater for project operations to be 76.4 acre-feet per year (AFY), but rounded this number up to 100 AFY in the AFC and supplemental documents.

Approximately 16,000 gallons of water per night would be used for mirror washing. To minimize the amount of water use, a pressure washer or other method would be used. Each heliostat within an array would be washed once every two weeks. The Applicant estimates that 100 heliostats can be washed per hour with 4 trucks working 10 hours per night at about 0.4 mile per hour (mph) (CH2ML2008b). Due to the high evaporation rates and minimal amount of water used, the Applicant estimated that the wash water would evaporate at or just below the ground surface. (Ex. 300, pp. 6.9-14 – 6.9-17.)

Wastewater. Sanitary wastewater from the sinks, showers, and toilets would be processed onsite by the septic and leach field system located near the administration building. This system would be installed in accordance with San Bernardino County and RWQCB LORS and Best Management Practices (BMPs). Residual sludge would be removed by a disposal service. Portable toilets would be located at each power block area. These toilets would be serviced regularly under contract by a waste management company. No wastewater would be discharged offsite.

Process wastewater from plant floor drains, hub drains, sumps, and piping will be reused to the extent practical. Process water will be sent through an oil/water separator and then stored in a raw water and fire water tank for later treatment and use in the steam boiler. Boiler blow down would be discharged to a flash tank to control the concentration buildup of solids and silica. (Ex. 300, pp. 6.9-17 – 6.9-18.)

4. Impact Evaluation Criteria

To evaluate if significant environmental impacts to soil or water resources would occur, we apply the following criteria. Where a potentially significant impact is

identified, we apply mitigation to reduce the potential impacts to less than significant levels.

- Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding or substantial erosion or siltation on or offsite?
- Would the project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?
- Would the project place structures within a 100-year flood hazard area which would impede or redirect flood flows?
- Would the project violate any water quality standards or waste discharge requirements?
- Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?
- Would the project contribute to any lowering of groundwater levels in the groundwater wells of other public or private water users?
- Would the project contribute to any lowering of the groundwater levels such that protected species or habitats are affected?
- Would the project cause substantial degradation to surface water or groundwater quality?

5. Construction Impacts and Mitigation

Construction of the proposed project includes soil excavation, grading, and installation of utility connections. Groundwater would be used primarily for dust suppression and hydrostatic testing of the project's piping connections. Impacts to soils related to increased erosion or release of hazardous materials are possible. Storm water impacts could result if increased runoff flow rates and volume discharge from the site were to increase flooding and sedimentation downstream. The Ivanpah playa could be impacted by the deposition or depravation of sediments. Water quality could be impacted by the release of

hazardous materials during construction. Project water demand could affect the quantity of available groundwater.

These construction activities can impact soil resources including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation and ephemeral water dependant habitats. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increased sediment deposition downstream. To minimize the effects of construction to the soil, the applicant has proposed the use of construction vehicle's designed to minimize their impact to the soil. Most of the proposed vehicles are heavy and low impact tires or tracks have been proposed to be used to minimize compaction of the soil that could be caused by these vehicles.

The magnitude, extent, and duration of those impacts depends on several factors, including the exposure of the soils to water and wind, the soil types affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation or high intensity and short duration runoff events coupled with earth disturbance activities can result in accelerated on-site erosion. In addition, high winds during grading and excavation activities can result in wind borne erosion leading to increased particulate emissions that adversely impact air quality. The implementation of appropriate erosion control measures would help conserve soil resources, protect downstream properties and resources, and protect air quality. Conditions of Certification in the Air Quality section provide mitigation that would prevent significant impacts from fugitive dust and soil erosion. Conditions of Certification **AQ-SC3** and **AQ-SC7** limit vehicle speed to 10 miles per hour during project construction and require all unpaved roads and disturbed areas in the project and linear construction sites to be watered as frequently as necessary during grading and stabilized thereafter with a non-toxic soil stabilizer or soil weighting agent. Condition of Certification **AQ-SC4** establishes performance standards for controlling fugitive dust and requirements for additional effort should they be exceeded. The requirement to use soil weighting and bonding agents following grading would conserve freshwater by reducing the need for water as a means to control fugitive dust.

Soil losses would develop during construction and there would be ongoing soil loss after construction of the project. The linear utilities would result in soil disturbance by vehicles and other equipment during installation. Use of construction BMPs in these areas is expected to control soil loss during construction and to mitigate potential impacts to air and downstream properties

and resources. Soil erosion and loss of soil due to project activities could be substantial and requires mitigation. Proposed erosion and sedimentation control measures include: preserving the existing vegetation to the extent possible; wetting or using soil binders or weighting agents on active construction and laydown areas; controlling speed on unpaved surfaces; placing gravel in entrance ways; and use of straw bales, silt fences, and earthen berms to control runoff. In Condition **SOIL&WATER-1** we require preparation and implementation of a Drainage Erosion and Sedimentation Control Plan (DESCP) to ensure adequate BMPs are in place to mitigate potential erosion and loss of soil. Condition of Certification **SOIL&WATER-2** requires the project owner to develop and implement a construction Storm Water Pollution Prevention Plan (SWPPP) specifying the application of the above mitigation measures. (Ex. 300, pp. 6.9-20 – 6.9-22.)

Condition of Certification **SOIL&WATER-3** requires that the onsite groundwater wells be constructed as required in applicable state and local laws and regulations. Condition **SOIL&WATER-4** limits construction and operation water use to no more than 100 AFY. As we discuss below, drawing up to 100 AFY from the groundwater basin will not affect other groundwater users. (Ex. 300, p. 6.9-22.)

Wastewater discharge will be required to comply with the applicable Regional Water Quality Control Board orders and other applicable regulations. (Ex. 300, p. 6.9-22.)

With the implementation of the mitigation measures described above, construction related soil and water impacts of the ISEGS will not be significant.

6. Operational Impacts and Mitigation

Stormwater flows through the project site, due to the low impact design proposed by the Applicant, will not result in substantial increases in either peak flow rates or sediment transport. (Ex. 300, pp. 6.9-23 – 6.9-27.) The results of Staff's modeling of these potential impacts, a refinement of the Applicant's modeling, are presented in **SOIL AND WATER RESOURCES Tables 2** (10-year event) **and 3** (100-year event), below

SOIL AND WATER RESOURCES Table 2
10 Year, 24-Hour Storm Event

Site Condition	Runoff Volume (acre-feet)	Peak Flow (cfs)	Maximum Velocity (feet per second)		Ivanpah 1 and 2 Potential Number of Heliostats Failing	Ivanpah 3 Potential Number of Heliostats Failing
			Flood Plain	Ephemeral Channel		
Pre-Construction	1,962	8,653	4.7	13.9		
Post-Construction	1,973	8,924	4.9	16.5	1,808	2,306
Numerical Difference	11 (1%)	271 (3%)	2 (4%)	11 (16%)		

(Ex. 300, p. 6.9-26.)

SOIL AND WATER RESOURCES Table 3
100 Year, 24-Hour Storm Event

Site Condition	Runoff Volume (acre-feet)	Peak Flow (cfs)	Maximum Velocity (feet per second)		Ivanpah 1 and 2 Potential Number of Heliostats Failing	Ivanpah 3 Potential Number of Heliostats Failing
			Flood Plain	Ephemeral Channel		
Pre-Construction	4,242	18,939	7	14		
Post-Construction	4,637	19,204	9	25	13,889	18,172
Numerical Difference	395 (8.5%)	265 (1.4%)	2 (22%)	11 (44%)		
Post-Construction - Applicant Most Likely Case	---	---	5.9	26.6	3,934	4,260
Post-Construction - Applicant Worst Case	---	---	8.0	25.5	10,250	10,250

(Ex. 300, p. 6.9-27.)

While neighboring properties will not be substantially affected by increased peak or sediment flows, the data suggests that a significant number of heliostats may fail due to erosion removing the soil support for their mounting poles, as many as 32,000 during a 100-year flood event. Condition of Certification **SOIL&WATER-5** requires study and testing to determine the optimum depth for the mounting poles so as to avoid erosion caused failure of the heliostats. (Ex. 300, p. 6.9-28.)

Groundwater pumping is not expected to significantly affect either the Ivanpah Valley water basin or substantially reduce the groundwater levels at pumps drawing from the basin, even when the other groundwater pumping by other foreseeable projects is included. Though some areas report reductions in water levels, the basin as a whole is experience a period in which recharge exceeds water draws. (Ex. 300, pp. 6.9-28 – 6.9-36.)

We adopt Condition of Certification **SOIL&WATER-6** to require monitoring of groundwater levels to establish a groundwater level baseline and to monitor changes over time in conjunction with the ongoing groundwater monitoring at the Primm Valley Golf Club. Condition **SOIL&WATER-4** assures that the project does not use more than the 100 AFY upon which our analysis is based.

We adopt Condition of Certification **SOIL&WATER-7** to ensure that the collection and recycling of operations wastewater would be managed in accordance with applicable BMP's and LORS. Condition **SOIL&Water-8** applies similar requirements to project sanitary wastes.

7. Cumulative Impacts and Mitigation

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code Regs., tit. 14, § 15130). The locations of existing and reasonably foreseeable developments in the Ivanpah Valley are presented in the the Cumulative Scenario section of Exhibit 300 (pp. 5-11 – 5-17). The estimated water use of those projects potentially affecting the Ivanpah Valley groundwater basin is summarized in **SOIL AND WATER RESOURCES Table 4**, below.

SOIL & WATER RESOURCES Table 4

Large-Scale Projects under Development or Reasonably Foreseeable in the Ivanpah Valley

Potential New Groundwater Users	Estimated Water Use	
	During Construction	During Operation
Desert Xpress Rail Line A proposed high-speed rail from Victorville to Las Vegas.	Unknown (limited duration)	Negligible
Interstate 15 Improvements Includes: (1) a proposed point-of-entry inspection station near the California-Nevada border; (2) a 12-mile-long northbound truck descending lane and pavement rehabilitation; and (3) re-grading of median slopes.	Unknown (limited duration)	<10 AFY
Temporary Caltrans Batch Plant The batch plant would be used during widening of the I-15 Highway.	Negligible	Negligible
Mixed-Use Development (near Jean) Demolition of the Nevada Landing Casino and redevelopment of this and adjoining land as a 166-acre master-planned community of affordable housing, commercial businesses, shops, and a new-hotel casino. This development is contingent on the construction of the new Ivanpah Valley Airport.	Unknown (limited duration)	Unknown
Ivanpah Energy Center A 500-MW, air-cooled, gas-turbine, combined-cycle power plant. Although the facility would be using up to 50 AFY of water, this water would be recycled water from the WWTP.	Unknown (limited duration)	15 AFY from an Undisclosed Groundwater Source 35 AFY from Recycled Water
Las Vegas Valley Water District Pipeline Proposed construction and operation of a water supply pipeline from the existing 2420 Zone Bermuda Reservoir (located in southern Las Vegas) to Jean, Primm, the Southern Nevada Correctional Center, and the proposed Ivanpah Valley Airport.	Unknown (limited duration)	Negligible The use of imported surface water in the Ivanpah Basin would result in additional discharges of wastewater. At least a portion of this wastewater would likely infiltrate to the groundwater basin, increasing groundwater recharge in the basin.
Southern Nevada Supplemental Airport (Ivanpah Valley Airport) The proposed airport is anticipated to use water supplied by the Las Vegas Valley Water District pipeline for both construction and operation activities	None	None

Potential New Groundwater Users	Estimated Water Use	
	During Construction	During Operation
Wind Energy Projects – Clipper Wind and PPM Wind	Unknown (limited duration)	Negligible
SCE Transmission Line Upgrades	Unknown (limited duration)	Negligible
Reoperation of the Molycorp Mine	Negligible	400 AFY
NextLight Silver State North and South Photovoltaic Power Plant (250-MW)	Unknown (limited duration)	Estimated 14 AFY
FirstSolar Photovoltaic Power Plant	Unknown (limited duration)	Estimated 6 to 30 AFY
Primm Outlet Mall New Fast-Food Restaurant To be located adjacent to the Primm Outlet Mall	Negligible	Estimated at 15 AFY

Ex. 300, pp. 6.9-41 – 6.9-42.

Construction and operation of the proposed project, including the grading, filling, and rerouting of ephemeral streams, would disturb approximately 3,600 acres of land and slightly increase the transport of storm water and colloidal sediment to the Ivanpah playa. Storm water and sediment transport impacts from previously constructed developments to the Ivanpah playa have been less than significant. Future projects would be subject to existing LORS and therefore designed to avoid, manage, and mitigate potential storm water and sediment impacts, as is the ISEGS. No cumulative impacts are predicted or expected.

The groundwater needs of the existing and reasonably foreseeable projects in the Ivanpah Valley were considered as part of the analysis of the direct project impacts on groundwater, above. ISEGS' groundwater use would contribute only 1.8 percent to the existing and only 1.7 percent of the reasonable foreseeable cumulative pumping volume in the IVGB. That analysis found that the total water demand would not exceed the annual recharge to the water basis. (Ex. 300, pp. 6.9-42.)

8. Compliance with LORS

Clean Water Act. RWQCB requirements are satisfied by our adoption of the following Conditions of Certification: 1) **SOIL&WATER-1**, requiring a DESCP; 2) **SOIL&WATER-5** requiring a Storm Water Damage Monitoring and Response Plan; and 3) **SOIL&WATER-2** requiring compliance with wastewater discharge

requirements. In addition, the applicant must meet California Department of Fish and Game Streambed Alteration Agreement requirements (Condition **BIO-20**).

Water Policies. Energy Commission policy, expressed in the *2003 Integrated Energy Policy Report* (IEPR), allows approval of the use of fresh water for cooling purposes only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. SWRCB Resolution 75-78 states that fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. The Warren-Alquist Act promotes all feasible means of water conservation. Each of the proposed power plants includes a steam turbine using an air-cooled condenser, which achieves maximum water conservation associated with cooling. Therefore, the proposed project complies with the requirements of SWRCB Resolution 75-78, the Energy Commission's *2003 Integrated Energy Policy Report* (IEPR), and the Warren-Alquist Act.

San Bernardino County Ordinance 3872. This ordinance requires a permit to locate, construct, operate, or maintain a new groundwater well within the unincorporated, unadjudicated desert region of San Bernardino County. The article does not apply to "groundwater wells located on Federal lands unless otherwise specified by inter-agency agreement." The BLM and County entered into a MOU that provides that the BLM will require conformance with the ordinance for all projects proposing to use groundwater from beneath public lands. As part of meeting the requirements of the County's permitting process, the County may require the project owner to prepare a groundwater monitoring plan in accordance with the County's "Guidelines for Preparation of a Groundwater Monitoring Plan" dated January 1998. Condition of Certification **SOIL&WATER-6** applies the County standards to the project's on-site groundwater wells as well as the submission of well completion reports to the Department of Water Resources. (Ex. 300, pp. 6.9-42 – 6.9-43.)

9. Public Comment

Comments were received suggesting that the Ivanpah Valley groundwater basin would be over-drafted by pumping for this project or by this project and the foreseeable future projects. The analysis conducted by Commission staff, discussed above, shows that expected water recharge exceeds the pumping by existing and future projects.

Comments were also received to the effect that the flood flows and the ability of the heliostat mounting poles to withstand those flood flows were underestimated by Staff and the Applicant. The evidence shows, as discussed above, that the project will be designed so that the flood water velocities and flows leaving the project will be only slightly greater than their pre-project levels. The study required by Condition **SOIL&WATER-5** will determine the appropriate depth for the mounting poles so that they will survive expected flood events.

FINDINGS OF FACT

1. The total site grading will amount to approximately 245,000 cubic yards of soil being moved at the ISEGS.

2. The BMPs identified in the record and required by the Conditions of Certification will avoid significant soil erosion and subsequent sedimentation during construction.

3. Adherence to the procedures in the construction SWPPP required by Condition **SOIL&WATER-2** and DESCP required by Condition **SOIL&WATER-1** will conserve soil resources, maintain water quality, prevent accelerated soil loss, and protect air quality.

4. The SWPPP and DESCP will establish methods to control and manage storm water flow as it reaches the project, flows across the project, and then leaves the project. Water and sediments leaving the project site will do so at rates substantially similar to pre-project levels.

5. Wastewater will be processed and disposed of according to standards, required by Condition **SOIL&WATER-7**, that will protect surface waters and ground water.

6. ISEGS's use of dry cooling with groundwater as the source of process water complies with the cooling water policy articulated in the Warren-Alquist Act.

7. Condition of Certification **SOIL&WATER–3** assures that the project's two groundwater wells will be constructed according to applicable County standards.

8. Compliance with Condition of Certification **SOIL&WATER-6**, which requires the project owner to monitor and mitigate impacts to groundwater, will minimize impacts to groundwater to a less than significant level.

9. Compliance with Condition of Certification **SOIL&WATER-8**, will mitigate any potential impacts from the operation of sanitary waste septic system and leach field to a less than significant level.

CONCLUSIONS OF LAW

1. The ISEGS will comply with all applicable LORS with implementation of the Conditions of Certification as set forth herein.

2. The ISEGS's use of air-cooled condensers for cooling is consistent with the Warren-Alquist Act (Pub. Res. Code § 25008), Article X § 2 of the California Constitution, Water Code § 13146, and State Water Resources Control Board (SWRCB) Resolutions 75-58 and 88-63.

3. The ISEGS will not result in any unmitigated, significant project-specific or cumulative adverse impacts to Soil or Water Resources.

CONDITIONS OF CERTIFICATION

SOIL & WATER-1: Prior to site mobilization, the project owner shall obtain both BLM's Authorized Officer and the CPM's approval for a site specific DESCP that ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, and identify all monitoring and maintenance activities. The project owner shall complete all engineering plans, reports, and documents necessary for both BLM's Authorized Officer and the CPM to conduct a review of the proposed project and provide a written evaluation as to whether the proposed grading, drainage improvements, and flood management activities comply with all requirements presented herein. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1** and shall contain the following elements:

- **Vicinity Map:** A map shall be provided indicating the location of all project elements with depictions of all major geographic features to include watercourses, washes, irrigation and drainage canals, major utilities, and sensitive areas.
- **Site Delineation:** The site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, underground utilities, roads, and drainage facilities. Adjacent property owners

shall be identified on the plan maps. All maps shall be presented at a legible scale

- **Drainage:** The DESCP shall include the following elements:

  a. Topography. Topography for off-site areas are required to define the existing upstream tributary areas to the site and downstream to provide enough definition to map the existing storm water flow and flood hazard. Spot elevations shall be required where relatively flat conditions exist.

  b. Proposed Grade. Proposed grade contours shall be shown at a scale appropriate for delineation of onsite ephemeral washes, drainage ditches, and tie-ins to the existing topography.

  c. Hydrology. Existing and proposed hydrologic calculations for onsite areas and offsite areas that drain to the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow.

  d. Hydraulics. Provide hydraulic calculations to support the selection and sizing of the onsite drainage network, diversion facilities and BMPs.

- **Watercourses and Critical Areas:** The DESCP shall show the location of all onsite and nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the construction site. Maps shall identify high hazard flood prone areas.

- **Clearing and Grading:** The plan shall provide a delineation of all areas to be cleared of vegetation, areas to be preserved, and areas where vegetation would be cut to allow clear movement of the heliostats. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross-sections, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCP shall include a statement of the quantities of material excavated at the site, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the project. Areas of no disturbance shall be properly identified and delineated on the plan maps.

Soil Wind and Water Erosion Control: The plan shall address exposed soil treatments to be used during construction and

operation of the proposed project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed project site that would not cause adverse effects to vegetation; BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by both BLM's Authorized Officer and the CPM prior to use.

- **Project Schedule:** The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element construction, and final grading/stabilization). BMP implementation schedules shall be provided for each project element for each phase of construction.
- **Best Management Practices:** The DESCP shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction.
- **Erosion Control Drawings:** The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion-control specialist.
- **Agency Comments:** The DESCP shall include copies of recommendations from the County of San Bernardino, California Department of Fish and Game (CDFG), and Lahontan Regional Water Quality Control Board (RWQCB).
- **Monitoring Plan:** Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches, and storm water diversions and the requirements specified in Appendix B, C, and D.

Verification: The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and relevant portions of the DESCP shall be submitted to the chief building official (CBO) for review and approval. In addition, the project owner shall do all of the following:

a. No later than ninety (90) days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to the County of San Bernardino and the RWQCB for review and comment. Both BLM's Authorized Officer and

the CPM shall consider comments received from San Bernardino County and RWQCB and approve the DESCP.

b. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage-, erosion- and sediment-control measures and the results of monitoring and maintenance activities.
c. Once operational, the project owner shall provide in the annual compliance report information on the results of storm water BMP monitoring and maintenance activities.
d. Provide BLM's Authorized Officer and the CPM with two (2) copies each of all monitoring or compliance reports.

WASTE DISCHARGE REQUIREMENTS

SOIL&WATER-2: The project owner shall comply with the requirements specified in Appendix B, C, and D for dredge and fill, wastewater, and storm water discharges associated with construction and industrial activity. The project owner shall develop, obtain both BLM's Authorized Officer and CPM approval of, and implement a construction Storm Water Pollution Prevention Plan (SWPPP) for the construction of the project and an Industrial SWPPP for operation of the project.

Verification: At least sixty (60) days prior to construction, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the construction SWPPP for construction of the project for review and approval. At least sixty (60) days prior to commercial operation, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the Industrial SWPPP for operation of the project for review and approval prior to commercial operation. The project owner shall retain a copy on site. The project owner shall submit copies to both BLM's Authorized Officer and the CPM of all correspondence between the project owner and the RWQCB regarding the WDRs for discharge of storm water associated with construction and industrial activity within ten (10) days of its receipt or submittal.

PROJECT GROUNDWATER WELLS

SOIL&WATER-3: Pre-Well Installation. The project owner shall construct and operate up to two onsite groundwater wells that produce water from the IVGB. The project owner shall ensure that the wells are completed in accordance with all applicable state and local water well construction permits and requirements, including the San Bernardino County's Desert Groundwater Management Ordinance. Prior to initiation of well construction activities, the project owner shall submit for review and comment a well construction packet to the County of San Bernardino, in accordance with the County of San Bernardino Code Title 2, Division 3, Chapter 6, Article 5, containing the documentation, plans, and fees normally required for the county's well permit, with copies to both BLM's Authorized Officer and the CPM. The project shall not construct

a well or extract and use groundwater until both BLM's Authorized Officer and the CPM provides approval to construct and operate the well.

Post-Well Installation. The project owner shall provide documentation to both BLM's Authorized Officer and the CPM that the well has been properly completed. In accordance with California's Water Code section 13754, the driller of the well shall submit to the DWR a Well Completion Report for each well installed.

Verification: The project owner shall ensure the Well Completion Reports are submitted and shall ensure compliance with all county water well standards and requirements for the life of the wells. The project owner shall do all of the following:

1. No later than 180 days prior to the construction of the onsite groundwater wells, the project owner shall submit a Groundwater Monitoring and Management Plan to the County of San Bernardino for review and comment (see Condition of Certification **SOIL&WATER- 6**).

2. No later than sixty (60) days prior to the construction of the onsite groundwater wells, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the water well construction packet submitted to the County of San Bernardino for review and comment.

3. No later than thirty (30) days prior to the construction of the onsite water supply wells, the project owner shall submit a copy of any written comments received from the County of San Bernardino indicating whether the proposed well construction activities comply with all county well requirements and meet the requirements established by the county's water well permit program.

4. No later than sixty (60) days after installation of each well at the project site, the project owner shall provide to both BLM's Authorized Officer and the CPM copies of the Well Completion Reports submitted to the DWR by the well driller . The project owner shall submit to the CPM, together with the Well Completion Report, a copy of well drilling logs, water quality analyses, and any inspection reports.

5. During well construction and for the operational life of the well, the project owner shall submit two (2) copies each to BLM's Authorized Officer and the CPM for review and approval any proposed well construction or operation changes.

6. The project owner shall provide BLM's authorized officer and the CPM with (2) two copies each of all monitoring and other reports required for

compliance with the County of San Bernardino water well standards and operation requirements.

7. No later than fifteen (15) days after completion of the onsite water supply wells, the project owner shall submit documentation to BLM's Authorized Officer and the CPM confirming that well drilling activities were conducted in compliance with Title 23, California Code of Regulations, Chapter 15, Discharges of Hazardous Wastes to Land, (23 CCR, sections 2510 et seq.) requirements and that any onsite drilling sumps used for project drilling activities were removed in compliance with 23 CCR section 2511(c).

CONSTRUCTION AND OPERATIONS WATER USE

SOIL&WATER-4: The proposed project's use of groundwater during construction shall not exceed an average of 200 acre-feet per year over the forty-three (43) month construction period.

Groundwater use for operations activities shall not exceed 100 acre-feet per year. Prior to the use of groundwater for construction, the project owner shall install and maintain metering devices as part of the water supply and distribution system to document project water use and to monitor and record in gallons per day the total volume(s) of water supplied to the project from this water source. The metering devices shall be operational for the life of the project.

Verification: Beginning 6 months after the start of construction, the project owner shall prepare a semi-annual summary of amount of water used for construction purposes. The summary shall include the monthly range and monthly average of daily water usage in gallons per day.

At least sixty (60) days prior to the start of construction of the proposed project, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of evidence that metering devices have been installed and are operational.

The project owner shall prepare an annual summary, which will include daily usage, monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary will also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal.

STORM WATER DAMAGE MONITORING AND RESPONSE PLAN

SOIL&WATER-5: The project owner shall ensure that the heliostats are designed and installed to withstand storm water scour of that may occur as a result of a 100-year storm event. The analysis of the storm

event and resulting heliostat stability will be provided within a Pylon Insertion Depth and Heliostat Stability Report to be completed by the applicant. This analysis will incorporate results from site-specific geotechnical stability testing, as well as hydrologic and hydraulic stormwater modeling performed by the applicant. The modeling will be completed using methodology and assumptions approved by the CPM and BLM's Authorized Officer.

The project owner shall also develop a Storm Water Damage Monitoring and Response Plan to evaluate potential impacts from storm water, including heliostats that fail due to storm water flow or otherwise break and scatter mirror debris on to the ground surface.

Verification: The basis for determination of pylon embedment depths shall employ a step-by-step process as identified below and approved by both the BLM's Authorized Officer and the CPM:

A. Determination of peak storm water flow within each sub-watershed from a 100-year event:
   - Use of San Bernardino County (SBC) Hydrology Manual to specify hydrologic parameters to use in calculations; and
   - HEC -1 and Flo-2D models will be developed to calculate storm flows from the mountain watersheds upstream of the project site, and flood flows at the project site, based upon hydrologic parameters from SBC.

B. Determination of potential total pylon scour depth:
   - Potential channel erosion depths will be determined using the calculated design flows, as determined in A above, combined with the methodology presented in "FAN, An Alluvial Fan Flooding Computer Program, FEMA, 1990."
   - Potential local scour will be determined using the calculated design flows, as determined in A above, combined with the Federal Highway Administration (FHWA) equation for local bridge pier scour from the FHWA 2001 report, "Evaluating Scour at Bridges."

C. The results of the scour depth calculations and pylon stability testing will be used to determine the minimum necessary pylon embedment depth within the active portions of the alluvial fans. In the inactive portions of the alluvial fans that are not subject to channel erosion and local scour, the minimum pylon embedment depths will be based on the results of the pylon stability testing. Active versus inactive areas of the alluvial fans will be determined from the USGS 2006 Open-File Report "Preliminary Surficial Geologic Map of the Mesquite Lake 30' x 60' Quadrangle, California and Nevada" authored by Schmidt and McMackin and field observations.

D. The results of the calculated peak storm water flows and channel erosion and heliostat scour analysis together with the recommended heliostat installation depths shall be submitted to the BLM's authorized officer and CPM for review and approval sixty (60) days before the start of heliostat installation.

The Storm Water Damage Monitoring and Response Plan shall be submitted to both the BLM's authorized office and CPM for review and approval and shall include the following:

- Detailed maps showing the installed location of all heliostats within each project phase;
- Description of the method of removing all soil spoils should any be generated;
- Each heliostat should be identified by a unique ID number marked to show initial ground surface at its base, and the depth of the pylon below ground;
- Minimum Depth Stability Threshold to be maintained of pylons to meet long-term stability for applicable wind, water and debris loading effects;
- Above and below ground construction details of a typical installed heliostat;
- BMPs to be employed to minimize the potential impact of broken mirrors to soil resources;
- Methods and response time of mirror cleanup and measures that may be used to mitigate further impact to soil resources from broken mirror fragments; and
- Monitoring, documenting, and restoring the Ivanpah playa surface when impacted by sedimentation or broken mirror shards.

A plan to monitor and inspect periodically, before first seasonal and after every storm event:

- Security and Tortoise Exclusion Fence: Inspect for damage and buildup of sediment or debris
- Heliostats within Drainages or subject to drainage overflow: Inspect for tilting, mirror damage, depth of scour compared to pylon depth below ground and the Minimum Depth Stability Threshold, collapse, and downstream transport.
- Drainage Channels: Inspect for substantial migration or changes in depth, and transport of broken glass.
- Constructed Diversion Channels: Inspect for scour and structural integrity issues caused by erosion, and for sediment and debris buildup.

- Ivanpah Playa Surface: Inspect for changes in the surface texture and quality from sediment buildup, erosion, or broken glass.

Short-Term Incident-Based Response:

- Security and Tortoise Exclusion Fence: repair damage, and remove built-up of sediment and debris.
- Heliostats: Remove broken glass, damaged structure, and wiring from the ground, and for pylons no longer meeting the Minimum Depth Stability Threshold, either replace/reinforce or remove the mirrors to avoid exposure for broken glass.
- Drainage Channels: no short-term response necessary unless changes indicate risk to facility structures.
- Constructed Diversion Channels: repair damage, maintain erosion control measures and remove built-up sediment and debris.

Long-Term Design-Based Response:

- Propose operation/BMP modifications to address ongoing issues. Include proposed changes to monitoring and response procedures, frequency, or standards.
- Replace/reinforce pylons no longer meeting the Minimum Depth Stability Threshold or remove the mirrors to avoid exposure for broken glass.
- Propose design modifications to address ongoing issues. This may include construction of active storm water management diversion channels and/or detention ponds.
- Inspection, short-term incident response, and long-term design-based response may include activities both inside and outside of the approved right-of-way. For activities outside of the approved right-of-way, the applicant will notify BLM and acquire environmental review and approval before field activities begin.

At least sixty (60) days prior to construction, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the Pylon Insertion Depth and Heliostat Stability Report for review and approval prior to construction. At least sixty (60) days prior to commercial operation, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the Storm Water Damage Monitoring and Response Plan for review and approval prior to commercial operation. The project owner shall retain a copy of this plan onsite at the power plant at all times. The project owner shall prepare an annual summary of the number of heliostats failed, cause of the failure, and cleanup and mitigation performed for each failed heliostat.

GROUNDWATER LEVEL MONITORING AND REPORTING PLAN

SOIL&WATER-6: The project owner shall submit a Groundwater Level Monitoring and Reporting Plan to both BLM's Authorized Officer and the CPM for review and approval and to San Bernardino County for review and comment regarding consistency with the County of San Bernardino Code Title 2, Division 3, Chapter 6, Article 5 (Desert Groundwater Management Ordinance). The Groundwater Level Monitoring and Reporting Plan shall provide a description of the methodology for monitoring background and site groundwater levels. Monitoring shall include pre-construction, construction, and project operation water use. The primary objective for the monitoring is to establish pre-construction and project related groundwater levels that can be quantitatively compared against observed and simulated levels near the project pumping well and near potentially impacted existing wells.

Prior to project construction, monitoring shall commence to establish pre-construction base-line conditions and shall incorporate the existing monitoring and reporting data collected for the Primm Valley Golf Club. The monitoring network shall be designed to incorporate the ongoing monitoring and reporting program established for the Primm Valley Golf Course. The monitoring plan and network may make use of existing wells in the basin that would satisfy the requirements for the monitoring program.

Verification: The project owner shall complete the following:

1. At least 3 months prior to construction, a Groundwater Level Monitoring and Reporting Plan shall be submitted to the County of San Bernardino for review and comment before completion of Condition of Certification **SOIL& WATER-3**, and a copy of the County's comments and the plan shall be submitted to both BLM's Authorized Officer and the CPM for review and approval. The Plan shall include a scaled map showing the site and vicinity, existing well locations, and proposed monitoring locations (both existing wells and new monitoring wells proposed for construction). The map shall also include relevant natural and man-made features (existing and proposed as part of this project). The plan also shall provide: (1) well construction information and borehole lithology for each existing well proposed for use as a monitoring well; (2) description of proposed drilling and well installation methods; (3) proposed monitoring well design; and, (4) schedule for completion of the work.

2. At least 2 months prior to construction, a Well Monitoring Installation and Groundwater Level Network Report shall be submitted to both BLM's Authorized Officer and the CPM. The report shall include a scaled map showing the final monitoring well network. It shall document the drilling methods employed, provide individual well construction as-builds, borehole

lithology recorded from the drill cuttings, well development, and well survey results. The well survey shall measure the location and elevation of the top of the well casing and reference point for all water level measurements, and shall include the coordinate system and datum for the survey measurements. Additionally, the report shall describe the water level monitoring equipment employed in the wells and document their deployment and use.

3. As part of the monitoring well network development, all newly constructed monitoring wells shall be permitted and constructed consistent with San Bernardino County and State specifications.

4. At least 2 months prior to project construction, all water level monitoring data shall be provided to both BLM's Authorized Officer and the CPM. The data transmittal shall include an assessment of pre-project water levels, a summary of available climatic information (monthly average temperature and rainfall records from the nearest weather station), and a comparison and assessment of water level data relative to the assumptions and spatial levels simulated by the applicant's groundwater model.

5. After project construction and during project operations, the project owner shall submit the monitoring data annually to both BLM's Authorized Office and the CPM. The summary shall document water level monitoring methods, the water level data, water level plots, and a comparison between pre- and post-project start-up water level trends. The report shall also include a summary of actual water use conditions, monthly climatic information (temperature and rainfall), and a comparison and assessment of water level data relative to the assumptions and spatial levels simulated by the applicant's groundwater model.

SEPTIC SYSTEM AND LEACH FIELD REQUIREMENTS

SOIL&WATER-8: Prior to the start of construction of the sanitary waste system, the project owner shall submit to the County of San Bernardino for review and comment, and to both the BLM's authorized officer and CPM for review and approval, plans for the construction and operation of the project's proposed sanitary waste septic system and leach field. These plans shall comply with the requirements set forth in County of San Bernardino codes and Appendices B, C, and D. Project construction shall not proceed both BLM's Authorized Officer and the CPM have approved the plans. The project owner shall remain in compliance with the San Bernardino County code requirements for the life of the project.

Verification: Sixty (60) days prior to the start of commercial operations, the project owner shall submit to the County of San Bernardino appropriate fees and plans for review and comment for the construction and operation of the project's sanitary waste septic system and leach field. A copy of these plans shall be submitted to both the BLM's authorized officer and CPM for review and approval.

The plans shall demonstrate compliance with the sanitary waste disposal facility requirements of County of San Bernardino and Appendices B, C, and D.

SOIL AND WATER RESOURCES - Appendix B

Facts for Wastewater Discharge

1. Reason for Action and Regulatory Authority

   The applicant filed an Application for Certification (AFC) with the California Energy Commission (Energy Commission) on August 31, 2007. The AFC proposed the construction and operation of the Ivanpah Solar Electric Generating System (ISEGS) project in the Ivanpah Valley in San Bernardino County, California. In conjunction with ISEGS project construction, the applicant proposes to discharge wastes, dredged, and/or fill material to State waters. Additionally, construction and operation of the ISEGS project would have the potential to impact water quality via storm water runoff.

   Under the Warren-Alquist Act, and Governor's Executive Order S-14-08, the Energy Commission has the authority to streamline permitting for renewable energy generation facilities. The Lahontan Regional Water Quality Control Board (Lahontan RWQCB) requirements for this project would be issued to the applicant through the Energy Commission's certification process.

   In a May 28, 2009 letter, the U.S. Army Corps of Engineers determined that the drainages on the site are not waters of the United States (U.S.). However, the drainages affected by the Project are waters of the State, as defined by California Water Code (Water Code) section 13050, and are subject to State requirements in accordance with Water Code section 13260 and to the Water Quality Control Plan for the Lahontan Region (Basin Plan). All actions impacting or potentially impacting these drainages, including dredge and fill activities and construction and industrial activities, would be regulated through these requirements, which would be incorporated in the Energy Commission's certification process.

2. Waste Discharge Requirements History

   The ISEGS project would be a new facility. There are no previous Lahontan RWQCB actions for the ISEGS project or location. The *Facts, Requirements,* and *Surface Water Monitoring and Reporting Program* for waste discharge address storm water, dredge and fill, and groundwater requirements for the proposed ISEGS project are presented herein.

3. Climate

   The Mojave Desert has a typical desert climate, i.e., extreme daily temperature changes, low annual precipitation, strong seasonal winds, and mostly clear skies. The annual highest temperature in the Mojave Desert exceeds 100 degrees Fahrenheit. Winter temperatures are more moderate, with mean maximum temperatures in the 60s and lows in the 30s. For the period of 1971 to 2000, the average annual precipitation in the vicinity of the ISEGS project ranged from 5 to 7 inches. Most of the precipitation occurs

between December and March. However, occasional heavy precipitation occurs in the summer due to thunderstorms.

4. Site Geology

   a. Setting

      The ISEGS project would be located in the Basin and Range Geomorphic Province, which is characterized by an extensional tectonic regime, i.e., block-faulted mountain ranges separated by down-dropped, sediment filled basins. The proposed project site is on the western flank of the Ivanpah Valley in the eastern Mojave Desert. Ivanpah Valley is an elongate, internally draining, structural basin, which extends north into Las Vegas Valley. The ISEGS project would be situated on the mid portion of a bajada (a broad apron of coalesced alluvial fans) on the east side of the Clark Mountains.

   b. Faulting and Seismicity

      The active northwest-trending State Line, Ivanpah, and Clark Mountain faults transect the Ivanpah Valley.

   c. Soils

      The proposed ISEGS project surface is covered by coarse-grained, gravelly soils that are characterized by the Natural Resource Conservation Service as well drained to excessively well drained with negligible to medium runoff potential.

5. Groundwater

   The Ivanpah Valley is underlain by the Ivanpah Valley Groundwater Basin (Department of Water Resources Basin No. 6-30). The north-south trending basin extends into Nevada and includes Jean Lake Valley at its northern extent. It is bounded by bedrock mountains, which have shed the detritus that forms the unconsolidated alluvial deposits of the basin. These deposits appear to extend to depths of 8,000 feet or more near the axis of the basin.

   Groundwater in the basin appears to be largely unconfined. In the vicinity of the ISEGS project, the depth to groundwater ranges from approximately 200 to 700 feet below ground surface. The shallower depth to groundwater occurs in the topographically lowest portion of the proposed ISEGS project, near Ivanpah Lake. In the western portion of the proposed ISEGS project area, which is topographically higher on the bajada, the depth to groundwater is the greatest. The groundwater flow direction is generally east toward Ivanpah Lake.

   Groundwater quality in the groundwater basin is generally good, although total dissolved solids (TDS) can be high in some areas. TDS at the ISEGS project site is estimated to be between 300 to 600 milligrams per liter (mg/L).

TDS levels increase in the proximity of Ivanpah Lake.

The applicant plans to install two groundwater wells and to use the wells to supply water during construction and operation. The ISEGS project would use a dry-cooling technology to avoid the use of water for power plant cooling.

6. Surface Water and Storm Water

Ivanpah Valley is an arid, internally draining basin. In the southern portion of the valley, surface water flow is toward Ivanpah Lake, a predominately dry lakebed. Numerous ephemeral channels (i.e., washes) drain from the Clark Mountains, across the bajada surface where the ISEGS project would be located, and terminate at Ivanpah Lake. The ephemeral washes are characterized by natural processes that, to varying degrees, support native desert wash vegetation and provide wildlife habitat.

Surface water drainage at the proposed ISEGS project area is a complex network of interconnected or anastomosing channels. The channels represent ephemeral washes that only flow when storm events generate runoff from the Clark Mountains. During such events, the proposed ISEGS project site can be subject to flash flooding and mass erosion. A hydrologic study and modeling performed by the applicant and the U. S. Bureau of Land Management (BLM) found that the 100-year flood event would inundate most of the proposed ISEGS project area through canalized and sheet flows, and would be primarily erosive in nature.

7. Land Uses and Existing Site Conditions

The proposed ISEGS project site and adjacent areas are federal lands managed by the BLM's California Desert District and are used for low intensity livestock grazing. The Primm Valley Golf Club is approximately 0.5 miles east of the proposed ISEGS project area.

The 4,073-acre ISEGS project consists of a relatively undisturbed Mojave creosote bush scrub environment, which supports a diversity of plant communities and a high diversity of wildlife, including the Federal and State Endangered desert tortoise.

8. Description of Dredge and Fill Impacts to State Waters

The ISEGS project involves the proposed discharge of structural materials and/or earthen wastes (fill) as described in **Table 1**.

TABLE 1
Dredge and Fill Impacts to Waters of the State*

Proposed Facility		Linear Impacts[4] (feet):	Impact Area (acres)	Fill Volume (cubic yards)	Dredge Volume (cubic yards)
30-foot-wide asphalt roads (including 3-foot shoulder)	Amount	11,639	---	---	---
	Temporary[1]		0.995	0	0
	Long-term[2]		0.5	806	806
	Permanent[3]		1.346	2,172	2,172
24-foot-wide asphalt roads	Amount	4,433	---	---	---
	Temporary		0.13	0	0
	Long-term		0.31	500	500
	Permanent		0.059	95	95
15-foot-wide dirt roads	Amount	2,022	---	---	---
	Temporary		0	0	0
	Long-term		0.192	0	0
	Permanent		0	0	0
12-foot-wide dirt roads	Amount	16,171	---	---	---
	Temporary		0.154	0	0
	Long-term		2.19	0	0
	Permanent		0.113	0	0
12-foot-wide rerouted trails	Amount	1,194	---	---	---
	Temporary		0	0	0
	Long-term		0.061	0	0
	Permanent		0.188	0	0
12-foot-wide gravel road	Amount	487	---	---	---
	Temporary		0	0	0
	Long-term		0	0	0
	Permanent		0.028	0	0
10-foot-wide heliostat maintenance paths	Amount	154,800	---	---	---
	Temporary		0	0	0
	Long-term		21.57	0	0
	Permanent		0	0	0
10-foot-wide heliostat arrays	Amount	158,285	---	---	---
	Temporary		21.8	0	0
	Long-term		0.031	0	0
	Permanent		0	0	0
Natural gas line corridor	Amount	7,380	---	---	---
	Temporary		0.939	0	0
	Long-term		0	0	0

TABLE 1
Dredge and Fill Impacts to Waters of the State*

Proposed Facility		Linear Impacts[4] (feet):	Impact Area (acres)	Fill Volume (cubic yards)	Dredge Volume (cubic yards)
	Permanent		0	0	0
Gas and water utility lines	Amount	1,126	---	---	---
	Temporary		0.215	2,828	2,828
	Long-term		0.19	0	0
	Permanent		0	0	0
Metering sets	Amount	80	---	---	---
	Temporary		0	0	0
	Long-term		0.005	0	0
	Permanent		0	0	0
Power blocks, diversion channels and berms	Amount	17,177	---	---	---
	Temporary		0	0	0
	Long-term		1.284	1,419	503
	Permanent		0.15	75	289
Gen-tie lines and towers	Amount	0	---	---	---
	Temporary		0	0	0
	Long-term		0	0	0
	Permanent		0	0	0
Administration/Maintenance Building	Amount	3,618	---	---	---
	Temporary		0	0	0
	Long-term		0.444	666	0
	Permanent		0	0	0
Substation	Amount	4,670	---	---	---
	Temporary		0	0	0
	Long-term		0	0	0
	Permanent		0.572	845	0
Construction laydown, staging and stockpiling	Amount		---	---	---
	Temporary		2.674	0	0
	Long-term		0	0	0
	Permanent		0	0	0
Perimeter fence installation	Amount	0	---	---	---
	Temporary		76	0	0
	Long-term		0	0	0
	Permanent		0	0	0
TOTAL DREDGE AND FILL IMPACTS	**Amount**	**383,082**			
	Temporary		**26.91**	**2,828**	**2,828**
	Long-term		**26.78**	**3,391**	**1,809**

TABLE 1
Dredge and Fill Impacts to Waters of the State*

Proposed Facility		Linear Impacts[4] (feet):	Impact Area (acres)	Fill Volume (cubic yards)	Dredge Volume (cubic yards)
	Permanent		**2.46**	**3,187**	**2,556**

NOTES:

*Table 1 is based on Ivanpah Solar Electric Generating System's Data Response to Energy Commission, Set 1P, *Beneficial Use and Dredge/F Analyses for Waters of the State,* September 9, 2009

[1] Temporary impacts are associated with construction activities, and these areas would be restored upon completion of construction.

[2] Long-term impacts would continue for the duration of ISEGS project operations, which is estimated at approximately 50 years. At ISEGS project decommissioning, these areas would be rehabilitated and revegetate

[3] Permanent impacts are associated with roads and structures that would remain following ISEGS project closu

[4] Note that linear distances are likely overestimated since there is redundancy among values for temporary, long-term, and permanent impacts.

9. Mitigation Plan

See Condition of Certification **Biology-20** for a description of the compensation requirements for impacts to waters of the State.

10. Storm Water Discharges

The existing slope and drainage of the proposed ISEGS project site have not been previously modified from their natural state. Topographically, the proposed site is relatively uniform and slopes down to the east at a gradient of approximately 5 percent. Grading would be minimized to the extent feasible (i.e., restricted to the three power blocks, support area, and areas with higher topographic relief in the northern portion of the proposed site). Outside of those specified areas, existing conditions would be largely maintained during construction and operation.

The *Requirements* contained in Attachment 3 regulate construction-related and industrial-related waste discharges in storm water runoff and other discharges that would be associated with ISEGS project. The requirements also direct the applicant to maintain pre-development infiltration, surface retention, and recharge rates in order to minimize post-development impacts to offsite water bodies and underlying groundwater. The applicant would be required to avoid adverse effects of altering the hydrologic characteristics (i.e., avoid hydromodification) of the ISEGS project area by site design and construction practices.

a. *Construction Storm Water Management*

The ISEGS project would be divided into three power-generating phases, referred to as Ivanpah 1, 2, and 3. The project phases would be built sequentially and the applicant estimates that construction would be

ongoing for a total of 24 months for each phase. Under the Storm Water Pollution Prevention Plan (SWPPP) and Drainage, Erosion, and Sediment Control Plan (DESCP), site grading would be minimized and most storm water would be allowed to flow unimpeded across the site in existing channels and as sheet flow. The applicant would implement Best Management Practices (BMPs) as described in the SWPPP and DESCP to prevent water quality impacts during construction.

b. *Post-Construction Storm Water Management*
Impacts to the onsite ephemeral washes would be minimized through the implementation of a low impact development approach (i.e., measures that maintain or mimic pre-development hydrology) as described in the DESCP. Storm water diversion structures would only be constructed around the substation and the three power blocks. The applicant proposes to manage storm water, erosion, and sedimentation at the completed ISEGS project through a comprehensive system of source controls, treatment BMPs, and site design. The final storm water management system must replicate pre-development hydrographs for the 2-year through the 10-year, 24-hour storm events. At a minimum, the applicant would adhere to detention and retention requirements of State Water Resources Control Board's *Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity, General Permit No CAS00002*; *Waste Discharge Requirements For Discharges of Storm Water Associated With Industrial Activities, General Permit No. CAS00001*; and all subsequent revisions and amendments to these general permits.

11. Wastewater Discharges

Wastewater generated by ISEGS project operation would be from three sources: wastewater generated after the piping and vessel hydrostatic testing, wastewater generated from washing the heliostats and, domestic waste discharged to onsite septic systems. The hydrostatic test water would either be trucked to a licensed treatment facility or disposed to land under a low threat to groundwater waiver in accordance with SWRCB Water Quality Order 2003-003-DWQ. The excess heliostat wash water would drain to the ground surface beneath the heliostats where it would evaporate. The septic systems would be sited and designed in accordance to the Basin Plan and San Bernardino County requirements.

12. Receiving Waters

The receiving waters are the "minor surface waters of the Ivanpah Hydrologic Area" (Hydrologic Subunit 612.00) and groundwaters of the Ivanpah Groundwater Basin (Department of Water Resources No. 6-30).

13. Basin Plan

The Lahontan RWQCB adopted the Basin Plan, which became effective on March 31, 1995. The *Requirements* and *Surface Water Monitoring and Reporting Program*, Attachments 2 and 3, respectively, implement the Basin Plan.

14. Beneficial Uses - Surface Waters

The Basin Plan designates beneficial uses for surface waters in each watershed of the Lahontan Region. The beneficial uses listed for minor surface waters of the Ivanpah Hydrologic Area include:

a. municipal and domestic water supply (MUN),

b. agricultural supply (AGR),

c. groundwater recharge (GWR),

d. water contact recreation (REC-1),

e. non-contact water recreation (REC-2),

f. commercial and sportsfishing (COMM),

g. warm freshwater habitat (WARM),

h. wildlife habitat (WILD).

15. Beneficial Uses - Groundwaters

The Basin Plan designates beneficial uses for groundwaters in each watershed of the Lahontan Region. Beneficial uses of groundwaters of the Ivanpah Groundwater Basin include:

a. municipal and domestic water supply (MUN),

b. agricultural supply (AGR),

c. industrial surface supply (IND),

d. freshwater replenishment (FRSH).

16. Non-Degradation

The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*). Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings or facts. The Basin Plan implements and incorporates by reference State antidegradation policies.

17. Other Considerations and Requirements for Discharge

Pursuant to Water Code section 13241, the *Facts, Requirements*, and *Surface Water Monitoring and Reporting Program* take into consideration:

a. *Past, present, and probable future beneficial uses of water*.
These requirements identify past, present, and probable future beneficial uses of water as described in Facts Nos. 14 and 15. The proposed discharge would not adversely affect present or probable future beneficial uses of the receiving waters.

b. *Environmental characteristics of the hydrologic unit and the groundwater basin under consideration, including the quality of water available thereto*.
Facts Nos. 3 through 7 describe the environmental characteristics and quality of waters in the hydrologic unit and groundwater basin.

c. *Water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect water quality in the area.*
These requirements would not result in changes to groundwater quality. Adverse effects to surface water quality would be minimized.

d. *Economic considerations*.
The Energy Commission's certification authorizes the applicant to implement closure and post-closure maintenance actions at the ISEGS project as proposed by the applicant. These requirements accept the applicant's proposed actions as meeting the best practicable control method for protecting water quality from impacts from the ISEGS project.

e. *The need for developing housing in the region*.
The applicant is not responsible for developing housing in the region.

f. *The need to develop and use recycled water*.
The water requirements for the ISEGS project would be minimized by the incorporation of dry-cooling technology. Additionally, there are no feasible sources of recycled water in the vicinity of the proposed ISEGS project.

SOIL AND WATER RESOURCES - Appendix C

REQUIREMENTS FOR WASTEWATER DISCHARGE

I. DISCHARGE SPECIFICATIONS

A. Storm Water Discharges

Waste in discharges of storm water must be reduced or prevented to achieve the best practicable treatment level using controls, structures, and management practices. The applicant shall comply with all requirements (with the exception of purely administrative requirements, e.g., filing a Notice of Intent) contained in State Water Resources Control Board's (SWRCB) *Waste Discharge Requirements For Discharges of Storm Water Runoff Associated With Construction Activity, General Permit No. CAS00002*; *Waste Discharge Requirements For Discharges of Storm Water Associated With Industrial Activities, General Permit No. CAS00001*; and all subsequent revisions and amendments.

These requirements do not preclude the applicant from requirements imposed by municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to separate storm sewer systems or other water, conveyances, and water bodies under their jurisdiction.

B. Receiving Water Limitations

Receiving water limitations are narrative and numerical water quality objectives contained in the Water Quality Control Plan for the Lahontan Region (Basin Plan). As such, the objectives are required to be met.

1. Surface Water Objectives

   The discharge of waste to surface waters shall not cause or contribute to a violation of the following water quality objectives for waters of the Ivanpah Hydrologic Unit (No. 612.00).

   a. *Ammonia*

      Ammonia concentrations shall not exceed the values listed in Tables 3-1 through 3-4 of the Basin Plan for the corresponding conditions in these tables. Tables 3-1 through 3-4 of the Basin Plan are incorporated into these requirements by reference.

   b. *Bacteria, Coliform*

      i. Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.

ii. The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 milliliter (ml) nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml. The log mean shall ideally be based on a minimum of not less than five samples collected as evenly spaced as practicable during any 30-day period. However, a log mean concentration exceeding 20/100 ml, or one sample exceeding 40/100 ml, for any 30-day period shall indicate violation of this objective even if fewer than five samples were collected.

c. *Biostimulatory Substances*

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect the water for beneficial uses.

d. *Chemical Constituents*

i. Waters designated as MUN (municipal and domestic supply) shall not contain concentrations of chemical constituents in excess of the primary or secondary maximum contaminant levels (MCL) based upon drinking water standards specified in provisions of the California Code of Regulations (CCR), Title 22, Division 4, Chapter 15, hereby incorporated by reference into these requirements. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

ii. Waters shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses.

e. *Chlorine, Total Residual*

For the protection of aquatic life, total chlorine residual shall not exceed either a median value of 0.002 milligrams/liter (mg/L) or a maximum value of 0.003 mg/L. Median values shall be based on daily measurements taken within any six-month period.

f. *Color*

Waters shall be free of coloration that causes nuisance or adversely affects the water for beneficial uses.

g. *Dissolved Oxygen*

i. The dissolved oxygen concentration as percent saturation shall not be depressed by more than 10 percent, nor shall the

ii. For waters with the beneficial uses of COLD (cold freshwater habitat) or WARM (warm freshwater habitat), the minimum dissolved oxygen concentration shall not be less than that specified in Table 3-6 of the Basin Plan. Table 3-6 of the Basin Plan is incorporated herein by reference.

h. *Floating Materials*

i. Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect the water for beneficial uses.

ii. The concentrations of floating material shall not be altered to the extent that such alterations are discernible at the 10 percent significance level.

i. *Oil and Grease*

i. Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect the water for beneficial uses.

ii. The concentration of oils, greases, or other film or coat generating substances shall not be altered.

j. *Pesticides*

i. For the purposes of these requirements, pesticides are defined to include insecticides, herbicides, rodenticides, fungicides, pesticides and all other economic poisons. An economic poison is any substance intended to prevent, repel, destroy, or mitigate the damage from insects, rodents, predatory animals, bacteria, fungi, or weeds capable of infesting or harming vegetation, humans, or animals (California Agriculture Code 12753).

ii. Pesticide concentrations, individually or collectively, shall not exceed the lowest detectable levels, using the most recent detection procedures available. There shall not be an increase in pesticide concentrations found in bottom sediments. There shall be no detectable increase in bioaccumulation of pesticides in aquatic life.

iii. Waters designated as MUN shall not contain concentrations of pesticides or herbicides in excess of the limiting concentrations set forth in the CCR, Title 22, Division 4, Chapter 15. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

k. *pH*

In fresh waters with designated beneficial use of COLD or WARM, changes in normal ambient pH levels shall not exceed 0.5 pH units.

l. *Radioactivity*

i. Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life nor which result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

ii. Waters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified by the more restrictive of the CCR Title 22 Division 4, Article 5 sections 64441 et seq. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

m. *Sediment*

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.

n. *Settleable Materials*

Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. The concentration of settleable materials shall not be raised by more than 0.1 milliliters/liter.

o. *Suspended Materials*

i. Waters shall not contain suspended materials in concentrations that cause nuisance or that adversely affect the water for beneficial uses.

ii. The concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10 percent significance level.

p. *Taste and Odor*

Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish or other edible products of aquatic origin, that cause nuisance, or that adversely affect the water for beneficial uses. The taste and odor shall not be altered.

q. *Temperature*

i. The natural receiving water temperature of all waters shall not be altered unless it can be demonstrated to the satisfaction of the Bureau of Land Management's (BLM's) Authorized Officer and Compliance Project Manager (CPM) that such an alteration in temperature does not adversely affect the water for beneficial uses.

ii. For waters designated COLD, the temperature shall not be altered. For waters designated WARM, water temperature shall not be altered by more than 5 degrees Fahrenheit above or below the natural temperature.

r. *Toxicity*

i. All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.

ii. 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 when necessary, for other control water that is consistent with the requirements for "experimental water" as defined in the most recent edition of *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association, et al.).

s. *Turbidity*

Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10 percent.

2. Groundwater Objectives

The discharge of waste to groundwaters shall not cause, or contribute to, a violation of the following water quality objectives for waters of the Ivanpah Groundwater Basin (Department of Water Resources No. 6-30).

a. Bacteria, Coliform

In groundwaters designated as MUN, the median concentration of coliform organisms over any seven-day period shall be less than 1.1/100 ml.

b. Chemical Constituents

i. Groundwaters designated as MUN shall not contain concentrations of chemical constituents in excess of the primary or secondary MCLs based upon drinking water standards specified in provisions of the CCR, Title 22, Division 4, Chapter 15, hereby incorporated by reference into these requirements. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

ii. Groundwaters shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses.

c. Radioactivity

Groundwaters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified by the more restrictive of the CCR Title 22 Division 4, Article 5 sections 64441 et seq. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

d. Taste and Odor

Waters shall not contain taste or odor-producing substances in concentrations that cause nuisance or that adversely affect beneficial uses. For groundwaters designated MUN, at a minimum, concentrations shall not exceed adopted secondary MCLs based upon drinking water standards specified in provisions of the CCR, Title 22, Division 4, Chapter 15, hereby incorporated by reference into these requirements. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

II. PROHIBITIONS AND REQUIREMENTS

The discharge of wastes and fill associated with the ISEGS project must not violate the following waste discharge prohibitions. These waste discharge prohibitions do not apply to discharges of storm water when wastes in the discharge are controlled through the application of management practices or other means and the discharge does not cause a violation of water quality objectives. The Energy Commission expects that control measures would be implemented in an iterative manner as needed to meet applicable receiving water quality objectives.

A. Regionwide Prohibitions

1. The discharge of waste[(i)] that causes violation of any narrative water quality objective contained in the Basin Plan, including the Nondegradation Objective, is prohibited.

2. The discharge of waste that causes a violation of any numeric water quality objective contained in the Basin Plan is prohibited.

3. Where any numeric or narrative water quality objective contained in the Basin Plan is already being violated, the discharge of waste that causes further degradation or pollution is prohibited.

4. The discharge of untreated sewage, garbage, or other solid wastes into surface waters of the Lahontan Region is prohibited. (For the purposes of this prohibition, "untreated sewage" is that which exceeds secondary treatment standards of the Federal Water Pollution Control Act, which are incorporated in the Basin Plan in section 4.4 under "Surface Water Disposal of Sewage Effluent.")

5. For municipal[(ii)] and industrial[(iii)] discharges:

   a. The discharge, bypass, or diversion of raw or partially treated sewage, sludge, grease, or oils to surface waters is prohibited.

   b. The discharge of wastewater except to the designated disposal site (as defined and in accordance with California Water Code [Water Code] section 13000 et seq.) is prohibited.

   c. The discharge of industrial process wastes[(iv)] to surface waters designated for the Municipal and Domestic Supply (MUN) beneficial

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Definitions:

(i) "Waste" is defined to include any waste or deleterious material including, but not limited to, waste earthen materials (such as soil, silt, sand, clay, rock, or other organic or mineral material) and any other waste as defined in the California Water Code § 13050(d).

(ii) "Municipal waste" is defined in section 4.4 of the Basin Plan.

(iii) "Industry" is defined in section 4.7 of the Basin Plan.

(iv) "Industrial process wastes" are wastes produced by industrial activities that result from one or more actions, operations, or treatments which modify raw material(s) and that may (1) add to

use is prohibited. The discharge of industrial process wastes to surface waters not designated for the MUN use may be permitted if such discharges comply with the *General Discharge Limitations* in section 4.7 of the Basin Plan and if appropriate findings under State and federal anti-degradation regulations can be made.

Prohibitions 5(b) and 5(c) do not apply to industrial storm water. For control measures applicable to industrial storm water, see section 4.3 of the Basin Plan, entitled "Stormwater Runoff, Erosion, and Sedimentation," specifically the requirements, which mandate the use of best available technology economically available (BAT) and best conventional pollution control technology (BCT) to reduce pollutants, and any more stringent controls necessary to meet water quality standards. Compliance with the requirements of a variety of laws and regulations for the control of hazardous materials and hazardous wastes may help to reduce potential storm water pollutants. Such programs include State and local laws to control toxic air pollutants, hazardous material storage and emergency response planning, the workers' right-to-know program, and hazardous waste source reduction and management review.

Prohibitions 5(b) and 5(c) do not apply to surface water disposal of treated groundwater. For control measures applicable to surface water disposal of treated ground water, see Lahontan Regional Water Quality Board Order No. R6T-2004-0025.

B. ISEGS Project Discharge Prohibitions

1. Activities and waste discharges associated with the ISEGS project must not cause or threaten to cause a nuisance or pollution as defined in Water Code section 13050.

2. The discharge, including discharges of fill material, must be limited to that described in the applicant's final *Drainage, Erosion*, *and Sediment Control Plan*.

3. The discharge or deposition of any wastes into channels, surface water, or any place where it would be discharged or deposited where it would be eventually transported to surface waters, including the 100-

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or create within the effluent, waste, or receiving water a constituent or constituents not present prior to processing, or (2) alter water temperature and/or the concentration(s) of one or more naturally occurring constituents within the effluent, waste or receiving water. Certain non-storm water discharges may occur at industrial facilities that are not considered to be industrial process wastes for the purposes of Prohibition 5(c). Examples include: fire hydrant flushing, atmospheric condensates from refrigeration and air conditioning systems, and landscape watering.

year floodplain, must not contain or consist of any substance in concentrations toxic to animal or plant life.

4. The discharge or deposition of any wastes into channels, surface water, or any place where it would be discharged or deposited where it would be eventually transported to surface waters, including the 100-year floodplain, must not contain or consist of oil or other floating materials from any activity in quantities sufficient to cause deleterious bottom deposits, turbidity, or discoloration in surface waters.

5. The discharge of waste, as defined in the Water Code that causes violation of any narrative water quality objective contained in the Basin Plan is prohibited.

6. The discharge of waste that causes violation of any numeric water quality objective contained in the Basin Plan is prohibited.

7. Where any numeric or narrative water quality objective contained in the Basin Plan is already being violated, the discharge of waste that causes further degradation or pollution (as defined in Water Code section 13050) is prohibited.

8. The discharge of septic tank pumpings (septage) or chemical toilet wastes to other than a sewage treatment plant or a waste hauler is prohibited.

C. Requirements

1. The applicant shall develop a final Storm Water Pollution Prevention Program (SWPPP) that is consistent with the requirements of State Water Board's *General Permit No. CAS00001* and *General Permit No. CAS00002*. This SWPPP, or any future revision to this SWPPP, shall be implemented after approval by the BLM's Authorized Officer and CPM.

2. The applicant must, at all times, maintain appropriate types and sufficient quantities of material on site to contain any spill or inadvertent release of materials that may cause a condition of pollution or nuisance if the materials reach waters of the State.

3. Discharges of wastewater generated by the ISEGS project's operations are not allowed to be released to the offsite environment.

4. The applicant must permit BLM's Authorized Officer and CPM or its authorized representative upon presentation of credentials:

a. Entry onto ISEGS project premises;

b. Access to copy any record required to be kept under the terms and conditions of the Final Staff Assessment (FSA);

c. Inspection of any treatment equipment, monitoring equipment, or monitoring method required by the FSA;

d. Sampling of any discharge or surface water covered by the FSA.

5. The applicant must immediately notify the BLM's Authorized Officer and CPM by telephone whenever an adverse condition occurs as a result of this discharge. Such a condition includes, but is not limited to, a violation of the conditions of the FSA, a significant spill of petroleum products or toxic chemicals, or damage to control facilities that would cause noncompliance. A written notification of the adverse condition must be provided to the BLM's Authorized Officer and CPM within two weeks of occurrence. The written notification must identify the adverse condition, describe the actions necessary to remedy the condition, and specify a timetable, subject to any modifications by BLM's Authorized Officer and CPM, for the remedial actions.

6. The applicant must comply with the *Surface Water Monitoring and Reporting Program* Attachment 3.

III PROVISIONS

A. Special Provisions for Fill Impacts to State Waters

1. Detailed final grading plans must be provided to the BLM's Authorized Officer and CPM a minimum of 90 days prior to commencement of construction activities.

2. Construction equipment must be clean and free from oil, grease, and loose metal material and must be removed from service if necessary to protect water quality.

3. Restoration of temporary disturbances and temporary discharges of fill to waters of the State must be achieved immediately following completion of work in an area of the temporary impacts. Restoration must include implementing measures to fully restore conditions to support all beneficial uses for the water body temporarily impacted in the shortest feasible time. Restoration must include, but is not limited to, grading to pre-project contours and revegetation with native species. The applicant must implement Best Management Practices

(BMPs) to control erosion and runoff from areas associated with temporary fills.

4. Mitigation for 29.2 acres of permanent and long-term impacts must be proposed prior to initiation of construction and approved by the BLM's Authorized Officer and CPM.

5. No debris, cement, concrete (or wash water there from), oil, or petroleum products must be allowed to enter into or be placed where it may be washed from the ISEGS project site by rainfall or runoff into waters of the State. When operations are completed, any excess material must be removed from the ISEGS project work area and any areas adjacent to the work area where such material may be transported into waters of the State.

6. No equipment may be operated in areas of flowing or standing water; no fueling, cleaning, or maintenance of vehicles or equipment must take place within any areas where a discharge to ephemeral channels or other waters of the State may occur; construction materials and heavy equipment must be stored outside of the channel perimeter of the waters of the State. When work within the boundaries of waters of the State is necessary, the entire stream flow must be diverted around the work area, temporarily, as needed to control waste discharge.

7. The applicant must immediately notify the BLM's Authorized Officer and CPM by telephone whenever an adverse condition occurs as a result of this discharge. Such a condition includes, but is not limited to, a violation of these conditions of certification, a significant spill of petroleum products or toxic chemicals, or damage to control facilities that would cause noncompliance. A written notification of the adverse condition must be provided to the BLM's Authorized Officer and CPM within two weeks of the occurrence. The written notification must identify the adverse condition, describe the actions necessary to remedy the condition, and specify a timetable subject to any modifications by BLM's Authorized Officer and CPM for the remedial actions.

B. Special Provisions for Storm Water

1. The applicant must ensure that storm water discharges and non-storm water discharges do not cause or contribute to an exceedance of any applicable water quality standards.

2. Industrial storm water discharges must use best available technology economically available (BAT) and best conventional pollution control technology (BCT) to reduce pollutants, and any more stringent controls necessary to meet water quality standards.

3. Post-construction storm water flows (volume and velocity) emanating from the ISEGS project site must not exceed two (2) percent of the volume and five (5) percent of the peak velocity discharge of the predevelopment levels. Runoff from newly constructed impervious areas that is greater than predevelopment levels must be treated and detained to predevelopment runoff levels. Methods such as *low impact development* may be used to achieve this requirement (see State Board Resolution No. 2008-0030).

4. The applicant must implement BMPs to prevent or reduce the discharge of wastes associated with water contacting construction materials or equipment.

5. The applicant must provide effective cover, mulch, fiber blankets, or other erosion control for soils disturbed by construction activities.

6. The applicant must provide BMPs for erosion stabilization for all areas of disturbed soil regardless of time of year, including erosion from rainfall, non-storm water runoff, and wind.

7. The applicant must stabilize to prevent erosion all finished slopes, open space, utility backfill, and graded or filled lots within two weeks from when excavation or grading activity has been completed.

8. The applicant must control runon from offsite areas, route flows away from disturbed areas in a manner that does not cause onsite or offsite erosion, and provide controls to minimize runon and problems from storm water flows to the ISEGS project area from offsite areas.

9. The applicant must, at all times, maintain effective perimeter controls (i.e., control around the ISEGS project area and all areas where there could be erosion or sediment discharges from the site), and stabilize all construction entrances/exits sufficiently to control erosion and soil or sediment discharges from the site.

10. The applicant must properly install and effectively maintain all BMPs for storm drain inlets and perimeter controls, runoff control BMPs, and stabilized entrances/exits.

11. The applicant must ensure that construction activity traffic to and from the ISEGS project is limited to entrances and exits that employ effective controls to prevent offsite tracking of soil.

12. The applicant must ensure that all storm drain inlets, perimeter controls, runoff control BMPs, and pollutant controls at entrances and

exits are maintained and protected from activities that could reduce their effectiveness.

13. The applicant must comply with the following source control requirements:

    a. Maintain vegetative cover to the extent possible by developing the ISEGS project in a way that reduces the amount of soil exposed to erosion at any time.

    b. Inspect and remove accumulated deposits of soil at all inlets to the storm drain system at frequent intervals during rainy periods.

    c. Provide buffer strips and/or vegetation protection fencing between the active construction area and any water bodies.

    d. Provide “good housekeeping” measures for construction materials, waste management, vehicle storage and maintenance, and landscape materials at all times including, but not limited to, the list of required measures in Attachment 2 of the *Surface Water Monitoring and Reporting Program*, (Attachment 3), which is made a part of these requirements.

14. The applicant must maintain, in perpetuity, post-construction control and treatment measures for storm water, or must identify in writing to the BLM’s Authorized Officer and CPM, the entity that is legally responsible for maintaining the post-construction controls at the ISEGS project site.

15. The applicant shall have in place adequate emergency response plans in order to clean up any spill or release of any waste at the ISEGS project site.

SOIL AND WATER RESOURCES - Appendix D

SURFACE WATER MONITORING AND REPORTING PROGRAM FOR WASTEWATER DISCHARGE

I. MONITORING

A. General Requirements

1. The applicant must comply with the "General Provisions for Monitoring and Reporting," which is attached to and made part of this Monitoring and Reporting Program (Attachment A).

2. In addition to General Provision 1 of Attachment A, the following provisions apply to sampling and analysis under this program:

   a. Quality assurance/quality control (QA/QC) procedures must be followed and a QA/QC plan must be included in the Sampling and Analysis Plan (SAP) that is provided to the California Energy Commission (Energy Commission). The SAP may be part of the Storm Water Pollution Prevention Program (SWPPP).

   b. The applicant may conduct their own field analysis of pH and turbidity if the applicant has sufficient capability (qualified and trained employees, properly calibrated and maintained field instruments, etc.) to adequately perform the field analysis.

   c. All monitoring instruments and equipment (including an applicant's own field instruments for measuring pH and turbidity) must be calibrated and maintained in accordance with manufacturer's specifications to ensure accurate measurements.

   d. With the exception of field analyses conducted by the applicant for pH and turbidity, all analyses must be sent to and conducted at a laboratory certified for such analysis by the California Department of Public Health.

3. The applicant must comply with the "Good Housekeeping Best Management Practices," which is attached to and made part of this Monitoring and Reporting Program (Attachment B).

B. Construction Site Storm Event Water Monitoring

The applicant must monitor site precipitation continuously and keep a record of storm events that produce more than 0.5 inch of precipitation at the site. During storms and/or within one business day after each 0.5 inch of precipitation from a storm event, the applicant must visually observe and document observations of storm water discharges from the site. For visual observations, the applicant must look for and document the presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

The applicant must visually observe and document observations of the discharge of stored or contained storm water that is discharged subsequent to a storm event. The applicant is only required to visually observe such discharges if they occur during daylight hours. Stored or contained storm water that will likely discharge after operating hours due to anticipated precipitation must be observed prior to the discharge to determine whether controls and best management practices (BMPs) are in place and functioning as required.

For the purposes of these requirements, a “potential storm event” is defined as any storm event with a 30 percent or greater chance of precipitation as predicted by the National Weather Service’s nearest weather station for the local climate zone. Forty-eight (48) hours prior to each potential storm event, the applicant must visually observe and implement appropriate corrective action for:

1. all storm water drainage areas, to identify any spills, leaks, or uncontrolled pollutant sources,

2. all BMPs (see Attachment 3B), to identify whether they have been properly installed and maintained, and

3. any storm water storage and containment areas, to detect leaks and ensure maintenance of adequate freeboard.

   Within one business day after each storm event that produces precipitation of 0.5 inch or more, the applicant must conduct a post-storm event inspection to:

   a. identify whether BMPs were adequately designed, implemented, and effective,

   b. identify if and where additional BMPs are needed, and where BMPs are in need of maintenance.

   Within one business day after the initial 0.5 inch of precipitation from a storm event, and every 1 inch thereafter, the applicant must collect and analyze samples of storm water discharged from any detention basins. If no discharge occurs from a basin, no sample is required, but the absence of discharge must be documented.

   Storm water sampling and analyses must be performed in accordance with the following requirements:

   a. The applicant must analyze the samples for pH and turbidity.

   b. The applicant is not required to physically collect samples or conduct visual observations during dangerous weather conditions or outside of scheduled site operation hours.

The applicant must perform sampling of storm water discharges from all drainage areas associated with construction activity. The storm water discharge collected and observed must represent the worst quality storm water discharge in each drainage area based on visual observation of the water and upstream conditions. For example, if there has been concrete work recently in an area, or drywall scrap is exposed to the rain, a pH sample must be taken of drainage from the relevant work area. Similarly, if muddy water is flowing through some parts of a silt fence, samples must be taken of the muddy water even if most water flowing through the fence is clear.

C. Construction Site Monitoring

1. On a daily basis, the applicant must inspect all public and private paved roads serving the ISEGS project and daily remove, by vacuuming or sweeping, visible accumulations of sediment or other construction activity-related materials that are deposited on the roads. All inspections under this provision must be documented in writing.

2. The applicant must ensure that inspections and observations at locations where runoff may discharge from the ISEGS project site are performed weekly, and at least once each 24-hour period during extended storm events, to identify any problems and/or BMPs that:

   a. need maintenance to operate effectively,

   b. have failed, or

   c. are inadequate to achieve effective control.

3. The applicant must visually observe construction areas and each drainage area for the presence of (or indication of prior) non-storm water discharges and their sources to ensure that all BMPs are in place and effective.

   a. One visual observation must be conducted quarterly in each of the following periods: January through March, April through June, July through September, and October through December. Visual observations are only required during daylight hours (sunrise to sunset).

   b. Visual observations must document evidence of any non-storm water discharge, pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.), and source. The applicant must maintain onsite records indicating the personnel performing the visual observation, the dates and approximate time each drainage area and non-storm water discharge was observed, and the response taken to eliminate non-storm water discharges

and to reduce or prevent pollutants from contacting non-storm water discharges.

4. The applicant must monitor and report runon from surrounding areas that may contribute to exceedances or excursions from requirements (violations).

D. Post-Construction Monitoring

On a semi-annual basis, the applicant must inspect and document inspections of post-construction treatment controls at the ISEGS project. Maintenance must be provided to address any controls that are not in compliance with requirements.

E. Receiving Water Monitoring

1. Receiving water sampling must be conducted at the sample locations designated in the final SWPPP.

2. Twice monthly and at no less than 10-day intervals from November through May of each year, the applicant must sample the ISEGS project's receiving waters with grab samples. The samples must be analyzed, at a minimum, for the following constituents:

   a. Turbidity,

   b. Temperature,

   c. Dissolved Oxygen,

   d. Suspended Solids,

   e. Total Dissolved Solids, and

   f. pH.

   If no water is present (documented by photographs), no sampling is required.

3. The applicant must also sample the receiving waters for the above parameter(s) when discharge from any detention basin occurs.

II. REPORTING

A. Required Program Reports

1. The applicant must develop and implement a final SWPPP, as described in II.B, below, and provide the final SWPPP to the Bureau of Land Management's (BLM's) Authorized Officer and CPM 90 days prior to commencement of construction activities. The SWPPP must include receiving water monitoring locations as required above.

2. The applicant must provide a Sampling and Analysis Plan (SAP) as referenced in I.A, above, to the BLM's Authorized Officer and CPM 90 days prior to commencement of construction activities. The SAP may be part of the SWPPP as described under I.A.2.

B. Storm Water Pollution Prevention Program

1. The final SWPPP must be developed and implemented to address the following objectives:

   a. To demonstrate that the site is in compliance with these requirements (*Requirements* in Attachment 2 and this *Monitoring and Reporting Program*). To determine whether immediate corrective actions, additional BMP implementation, or SWPPP revisions are necessary to reduce pollutants and wastes in storm water discharges and non-storm water discharges; and

   b. To determine whether BMPs included in the SWPPP are effective in preventing or reducing pollutants in storm water discharges.

2. The applicant must develop a final SWPPP that includes all monitoring procedures and instruction, location maps, forms, and checklists as required in these requirements and this MRP.

C. Storm Water Pollution Prevention Plan Annual Report

1. The applicant must prepare and provide an annual report no later than January 30 of each year.

2. The Annual Report must include a summary and evaluation of all sampling and analysis results, original laboratory reports, a summary of all corrective actions taken during the compliance year, and identification of any recommended compliance activities or corrective actions that were not implemented.

3. The Annual Report must include all records and reports of visual observations and sample collection exceptions, the analytical method, method reporting unit, and method detection limit of each analytical parameter.

D. Records

1. The applicant must maintain records on site of all visual observations, personnel performing the observations, observation dates, weather condition, locations observed, and corrective actions taken in response to the observations.
2. All inspections and observations pursuant to Section I.C. above must be documented in writing and must include:
    a. Inspector's name, title, and signature.
    b. Inspection date and date the inspection report was written.
    c. Weather information: estimate of beginning of storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall (inches).
    d. A list and description of BMPs evaluated and any deficiencies noted. If there are no deficiencies, the report must indicate (under penalty of perjury) that the ISEGS project is in compliance with these discharge requirements.
    e. Report the presence of noticeable odors or any visible sheen on the surface of any discharges.
    f. Corrective actions required, including any changes necessary to comply with requirements, and implementation dates for completing corrective actions.
    g. Photographs taken during the inspection.
3. Records of all storm water monitoring information and copies of all reports (including Annual Reports) required by these requirements must be retained for a period of at least three years from the date of the sample, measurement, report, or application. This period may be extended when requested by the BLM's Authorized Officer and CPM. Records must be retained on site while construction is ongoing. The records must include:
    a. The date, place, time of project inspections, sampling, visual observation, and/or measurement, including precipitation;
    b. The individual(s) who performed the project inspections, sampling, visual observations, and/or measurement;
    c. The date and approximate time of analyses;
    d. The individual(s) and company who performed the analyses;

e. A summary of all analytical results from the last five years, the method detection limits and reporting units, and the analytical techniques or methods used;

f. QA/QC records and results;

g. Non-storm water discharge inspections and visual observations and storm water discharge visual observation records; and

h. Visual observation and sample collection exception records.

C. CULTURAL RESOURCES

The potential for impacts to cultural resources depends upon whether such resources are present and whether they would actually be encountered during project development, construction, and operation activities. Cultural resource materials such as artifacts, structures, or land modifications reflect the history of human development. Certain places that are important to Native Americans or local national/ethnic groups are also considered valuable cultural resources. Analysis in this topic area pertains to the structural and cultural evidence of human development in the project vicinity as well as appropriate mitigation measures, should cultural resources be disturbed by project excavation, construction, or operation. The evidence on this matter was undisputed. (1/13/10 RT 51-52, 164; Exs. 1, 2, 3, 4, 5, 8, 13, 20, 21, 24, 25, 32, 33, 57, 65, 85, 300, pp. 4.12 through 4.12-96, 5-1 through 5-34.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Setting

The Ivanpah Solar Electric Generating System (ISEGS) project is located in the Ivanpah Valley of the eastern Mojave Desert. The historic period of the region begins in 1776 with the travels of Francisco Garces. (Ex. 300, p. 4.12-18.) The desert's history is characterized by increased traffic after the discovery of gold in California in 1848 and California statehood in 1850. The Mohave Road and Old Spanish Trail (or Mormon Road) were the primary nineteenth-century transportation routes through the Mojave Desert before the construction of railroads in the region. Mining was another major historic theme in the Mojave Desert after 1846, which, in turn, led to better transportation (including increased rail lines) by the beginning of the twentieth century. Since 1936, the eastern Mojave Desert has been the major corridor for the transmission of hydroelectric power from Hoover Dam. (Ex. 300, p. 4.12-21.)

The evidence shows, however, that much of the important history of the Mojave Desert took place beyond the proposed project area.[1] The evidence further indicates marginal historic use of the project area and a transitory historical

[1] For purposes of the cultural resources analyses, the "project area" is the geographic area in which the construction and operation of the proposed project may have the potential to directly and indirectly impact cultural resources. This area includes the footprint of the facility, ancillary facilities, facility access roads, and areas beyond the project area where the project may visually intrude on cultural resources. (Ex. 300, p. 4.19-23.)

Native American use of the project area and vicinity. The record also indicates sporadic historic and current prospecting and low intensity livestock grazing in and near the project area. (Ex. 300, p. 4.12-5, 4.12-18, 4.12-19.)

2. Method and Threshold for Determining Significance

CEQA requires a lead agency to determine first whether a project may impact a resource that falls within the definition of "historical resource" and second, whether any such impact will cause a substantial adverse change in the significance of a historical resource and may therefore have a significant on the environment.

CEQA requires the Energy Commission to evaluate such resources by determining whether they meet several sets of specified criteria. NEPA similarly requires the Bureau of Land Management (BLM) to evaluate resources for eligibility listing on the National Register of Historic Places (NRHP).

Under the CEQA Guidelines, a "historical resource" is:

- A resource included in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (CRHR);

- A resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of Section 5024.1 (g) of the Public Resources Code; or

- Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record. [Cal. Code of Regs., tit.14, § 15064.5(a).]

Furthermore, under the CEQA Guidelines, a resource is generally considered historically significant if it meets the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to

being at least 50 years old,[2] a resource must meet at least one of the following criteria:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in history or prehistory. [Pub. Resources Code § 5024.1.]

In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. [Cal. Code Regs., tit. 14, § 4852(c).]

Historical resources automatically listed in the CRHR include California historical resources listed in or formally determined eligible for the NRHP and California Registered Historical Landmarks from No. 770 onward. [Pub. Res. Code, § 5024.1(d).] Notably, even if a resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows a lead agency to determine that a resource is a historical resource as defined in Public Resources Code sections 5020.1 (j) or 5024.1.

Developing an inventory of historical resources in and near a project area is the first step of the required resources analysis. The record shows that the efforts of the Applicant, BLM, and Staff to develop the inventory included an investigatory phase comprised of a background research, consultation with local Native American communities, primary field research, and evaluating the significance of found cultural resources. (Ex. 300, p. 4.12-23.)

The Applicant's records search included all known cultural resources within a one- mile radius around the project site and 0.25 miles to each side of the linear infrastructure proposed for the project. (Ex. 300, p. 4.12-24.) The search returned information on the known inventory of prehistoric and historical archaeological resources, built-environment resources, cultural landscapes,

[2] The Office of Historic Preservation's Instructions for Recording Historical Resources (1995) endorses recording and evaluating resources over 45 years of age to accommodate a five-year lag in the planning process.

traditional cultural resources, and the heritage resources for which designations of significance already exist. The search also returned results of prior prepared technical reports. (Ex. 300, p. 4.12-24.)

The records and relevant prior-prepared cultural resources studies included an Environmental Assessment (EA) prepared under NEPA and obtained from the BLM Needles field office. The EA pertains to a recent renewal of the Clark Mountain grazing allotment that includes 97,848 acres of public land across a number of different environmental zones in the Ivanpah and Mesquite valleys in San Bernardino County, and encompasses the project area. The surveys that informed the EA took place over the past 30 years and resulted in the identification of 46 cultural resources. (Ex. 300, p. 4.12-27.) Significantly, the EA provides information on the distribution of cultural resources beyond the project area.

Preparation of the inventory also included performing a California Historical Research Information System (CHRIS) records search. This search notes three prehistoric archaeological sites (three rock shelters) in the vicinity of the project area but none in the project area. (Ex. 300, p. 4.12-36.)

As shown in **Cultural Resources Table 1,** below, the records searches revealed eight cultural resources in the vicinity of the project area. Of these, only one is within the project area: the Hoover Dam-to-San Bernardino Transmission Line. (Ex. 300, p. 4.12-26.)

CULTURAL RESOURCES TABLE 3
Previously Recorded Cultural Resources in the Records Search Area

Resource Designation No.	***Description***	***Approximate Distance and Direction to Project Area***
CA-SBR-816, 2341	Rock shelter	1.0 miles NW of Ivanpah No. 3
CA-SBR-2342	Rock shelter	1.0 miles NW of Ivanpah No. 3
CA-SBR-6956	Rock shelters and milling features	0.85 miles NW of Ivanpah No. 3
CA-SBR-7347H	Dirt road, two-track with low side berms	0.5 miles WSW of Ivanpah No. 1
CA-SBR-7689H	Arrowhead Trail Highway (State Route 31)	0.6 miles E of Ivanpah No. 1
CA-SBR-7694H	Boulder Transmission Lines 1, 2, and 3	0.8 miles N of Ivanpah No. 3
CA-SBR-10315H	Original 132-kV transmission line from the City of San Bernardino to	Between Ivanpah No. 1 and Ivanpah No. 2

Resource Designation No.	*Description*	*Approximate Distance and Direction to Project Area*
	the Hoover Dam, now known as the Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115-kV transmission line	
CA-SBR-10803H	Stock-loading facility with ancillary improvements	0.5 miles E of Ivanpah No. 1

The record shows that fieldwork also informed the inventory. The fieldwork was comprised of a geoarchaeology study, two reconnaissance surveys, and two intensive pedestrian surveys. (Ex. 300, p. 4.12-38.) This work resulted in Staff finding two new archaeological sites, which were given temporary field numbers ISEGS-01 and ISEGS-02. (Ex. 300, pp. 4.12-44 though 4.12-45.) ISEGS-01 includes five dry-stacked rock features and feature complexes arranged on both sides of the crest of the tiny inselberg directly south of the larger eastern portion of the Precambrian metamorphic inselberg complex, which is east of the Ivanpah No. 3 project site boundary. (Ex. 300, p. 4.12-61.) ISEGS-02 is a historic trash scatter or refuse deposit that appears to date roughly to the 1890s to 1910s. The site appears to be a discrete, primary deposit measuring approximately 15-20 feet in diameter, representing the locus of a temporary campsite. (Ex. 300, p. 4.12-45.)

Significantly, the fieldwork did not result in the discovery of prehistoric or historic cultural resources or in any archaeological features or deposits with characteristics of Native American traditional use areas. (Ex. 300, pp. 4.12-38 through 4.12-48.)

The available ethnographic literature discussed in the record indicates that the project area is within the ancestral territories of three major Native American groups: Southern Paiute, Chemehuevi, and Mojave. (Ex. 300, p. 4.12-16.) The Applicant, BLM, and Staff consulted with Native American groups that might have an interest in the project area. According to the California Native American Heritage Commission, its Sacred Lands File did not indicate any Native American cultural resources in the immediate project area. (Ex. 300, p. 4.12-32.) No other Native American group provided information regarding possible cultural resources in the project area. (Ex. 300, pp. 4.12-32- 4.12-33.)

3. NHRC and CRHR Eligibility

The record shows that on the basis of background research and the results of the field efforts, the total cultural resources inventory for the project area includes one new archaeological resource[3], no ethnographic resources, and three built-environment resources. (Ex. 300, pp. 4.12-38 through 4.12-52.) These resources are shown in **Cultural Resources Table 2,** below.

ISEGS-01 is the archaeological resource in the project area. Staff and BLM jointly developed a protocol to asses and evaluate the origin and historical significance of ISEGS-01, including whether the site is a Native American traditional use area eligible for inclusion in either the CRHR or the NRHP. (Ex. 300, p. 4.12-53.) The record shows that the results of the evaluation protocol were inconclusive insofar as the background research on, and the field investigation of, the site did not reliably associate it with any particular time period or archaeological, ethnographic, or historic culture. Thus, it appears that Staff and BLM properly concluded that there is presently no reliable archaeological means to verify or refute the character or the use of the site to establish CRHR or NRHP eligibility. (Ex. 300, pp. 4.12-56, 4.12-62.) We concur with the conclusions regarding CRHR eligibility and further conclude that there appears to be no basis at this time to otherwise consider ISEGS-01 as historically or culturally significant. And, thus, there is no need to further assess whether possible degradation of the integrity of the site from the construction and operation of proposed project would be either a substantial adverse change in the significance of a historical resource.

We reach a similar conclusion with respect to two of the three built-environmental resources. As previously discussed, there are three built-environment resources in the project area: (1) the Hoover Dam-to-San Bernardino transmission line (CA-SBR-10315H), (2) a dismantled, early-to-mid-twentieth-century telephone line and an unimproved, two-track dirt road that parallels it (CA-SBR-12574H), and (3) an approximately 1,200 foot-long segment of a faint, unimproved two-track dirt road (CA-SBR-12575H). The Hoover Dam-to-San Bernardino transmission line has already been deemed eligible for inclusion in the NRHP and is listed on the CRHR. However, the record shows that neither the telephone line nor the dirt road appear eligible for CRHR or NRHP listing or for further consideration as historically or culturally significant. (Ex. 300, pp. 4.12-52, 4.12-62 through 4.12-66.)

[3] Given its nature, ISEGS-02 did not warrant further consideration as a resource of significance.

CULTURAL RESOURCES TABLE 2
Present Inventory of Cultural Resources in the Project Area of Analysis

Cultural Resource Type (Year of Initial Recordation)	Description	Location	California Register of Historical Resources Eligibility (CRHR) and National Register of Historic Places (NRHP) Status	Siting Case Report Reference
Historic Built-Environment Resources				
CA-SBR-10315H (1988)	Hoover Dam-to-San Bernardino transmission line, now known as the Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line	Sec. 3, T. 16 N., R. 14 E., Between Ivanpah No. 1 and Ivanpah No. 2	Consensus determination (2S2) as individually eligible for the NRHP (10/22/93), and therefore listed on the CRHR	Fergusson 2007
CA-SBR-12574H (2007)	Dismantled telephone line and dirt road, two -track	Sec. 3 and 4, T. 16 N., R. 14 E., Through NW quadrant of Ivanpah No. 1	See "California Register of Historical Resources Eligibility" subsection, below	Fergusson 2007
CA-SBR-12575H (2007)	Dirt road, faint two-track	Sec. 3, T. 16 N., R. 14 E, Through NW quadrant of Ivanpah No. 1.	See "California Register of Historical Resources Eligibility" subsection, below	Fergusson 2007
Archaeological Resources				
ISEGS-01 (2008)	Complex of dry-stacked masonry features that include apparent terraces, niches, a bench, and a rock platform	Sec. 34, T. 17 N, R. 14 E., E of Ivanpah No. 2	See "California Register of Historical Resources Eligibility" subsection, below	Helton, Lawson, and Spaulding 2008; Lawson, Helton, and Spaulding 2008
Ethnographic Resources				
None				

4. Construction and Operation Impacts and Mitigation

Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. (Ex. 300, p. 4.12-66.) Indirect impacts to archaeological resources are generally those that result from increased erosion due to site clearance and preparation, or from inadvertent damage or vandalism to exposed resources. (Ex. 300, p. 4.12-66.)

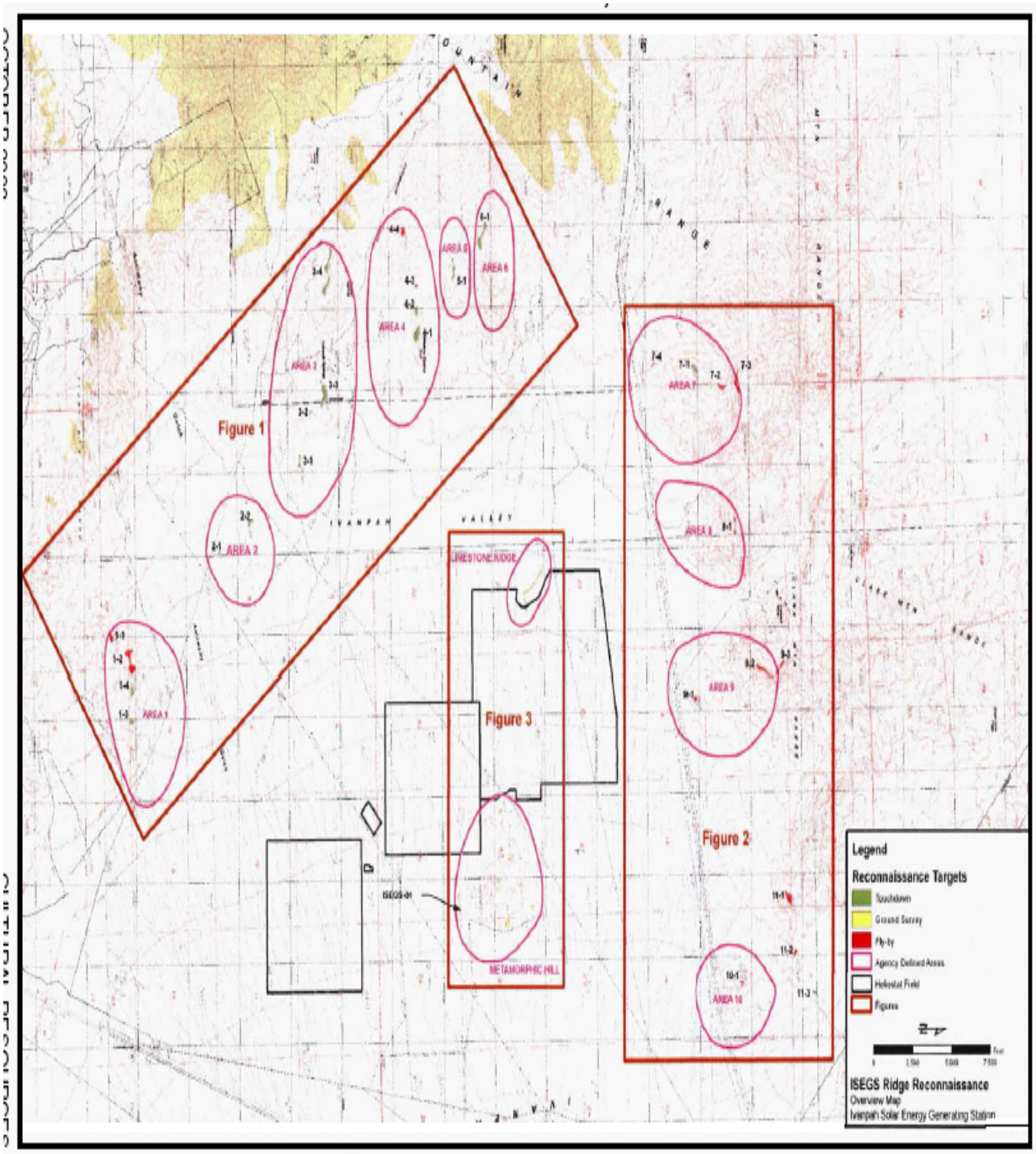
As discussed above, the evidence shows that there are no known NRHP- or CRHR-eligible prehistoric or historical archaeological resources on the surface of, or beneath, the project site. Nor are there any known NRHP- or CRHR-eligible ethnographic resources on the project site or in the project area. As a result, neither construction nor operation is expected to impact archaeological and ethnographic resources. Staff nonetheless recommended, and we have adopted, Conditions of Certification **CUL-1** through **CUL-7**, and **CUL-10** to ensure that the project will have no direct or indirect impacts on known or unknown, NRHP- or CRHR-eligible archaeological, ethnographic, or built-environmental resources and that any impacts to later discovered resources will be mitigated to a less-than-significant level.

5. Cumulative Impacts

A cumulative effect refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effects of the proposed project. (Pub. Resources Code § 21083, Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.)

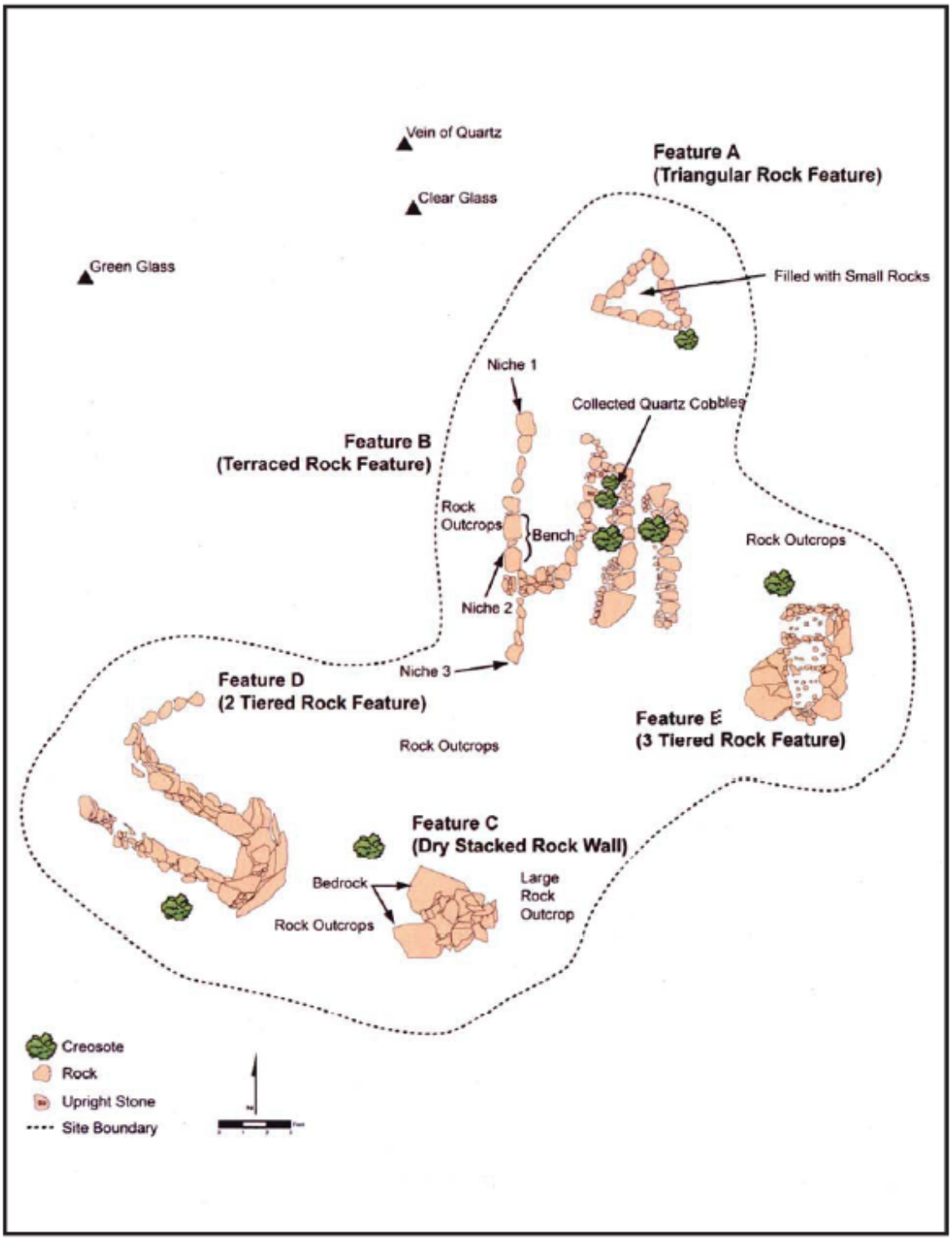
The record shows that the Applicant and Staff evaluated the potential cumulative impacts of the project combined with other closely related past, present, and reasonably foreseeable future projects. An initial step of the evaluation was the identification of projects whose impacts may compound or increase the incremental effect ISEGS. (Ex. 1, p. 5.3-22, 300, pp. 4,12-70 through 4.12-73.) Local and regional foreseeable future projects are identified in **Figures 1 and 2**.

Cultural Resources – Figure 1



Source: Ex. 300.

Cultural Resources – Figure 2



Source: Ex. 300.

The evidence shows that the ISEGS project would, in combination with reasonably foreseeable projects, contribute to significant local cumulative impacts to the proposed Hoover Dam-to-San Bernardino transmission line reconstruction. Staff proposed, and we have adopted, Conditions of Certification **CUL-8** and **CUL-9** to offset the impacts to the line reconstruction.

With respect to other known and unknown cultural resources, the record shows that ISEGS impacts would not have potential to combine with impacts of past, present, and reasonably foreseeable projects to result in a significant contribution *locally*. However, with respect of *regional* impacts, the record shows that ISEGS impacts would combine with impacts of proposed solar and wind development projects in southeastern California, southern Nevada, and western Arizona to result in cumulatively considerable impacts to unknown cultural resources. Staff points out that project proponents for other future projects in the area might be able to avoid causing substantial adverse changes to CRHR-eligible cultural resources through deliberate project planning, or reduce such impacts to presently unknown cultural resources to less than significant level by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated for be CRHR-eligible.

Furthermore, because unknown, unrecorded cultural resources – when discovered – will be treated in accordance with applicable federal and state laws and regulations as well as in compliance with the mitigation measures and permit requirements applicable to a project, any found resources will be protected thereby reducing the effect of impacts. Thus, such avoidance or mitigation of potential future significant impacts to presently unknown cultural resources would render the potential contribution of the ISEGS project to cumulative impacts on such resources negligible. (Ex. 300, p. 4.12-71 through 4.12-73.)

6. Public Comments

The Wilderness Society and the Natural Resources Defense Council jointly advised Staff and the BLM to "carefully evaluate the final results of field research to determine whether cultural resources exist in the project area. If cultural resources exist, the agencies should thoroughly analyze the impacts of the ISEGS project to those resources and develop a comprehensive impacts minimization and mitigation plan." (CEC Docket Log # 49993.) Staff and the BLM believe, and we agree, that the discussion, analysis, and conclusions of the Cultural Resources section of the Final Staff Analysis and the Conditions of

Certification adopted herein, adequately address the concerns raised by the comment.

FINDINGS AND CONCLUSIONS

Based on the uncontroverted evidence of record, the Commission makes the following findings and reaches the following conclusions:

1. Cultural resources exist in the general project area.

2. Construction and operation activities associated with the ISEGS project and related facilities will have no significant direct or indirect impacts on known archaeological, ethnographic, or built-environment resources, with the implementation of Conditions of Certification **CUL-1** through **CUL-7** and **CUL-10**.

3. The potential for impacts to unknown cultural resources may not be discovered until subsurface soils are exposed during excavation and construction. Implementation of Conditions of Certification **CUL-1** through **CUL-7** and **CUL-10** will facilitate identification and assessment of such resources and will mitigate any potential significant impacts to them. Included among these requirements is the obligation of the project owner to provide Cultural Resources Specialist and archaeological monitors with authority to halt construction if unknown resources are discovered.

5. The potential for cumulatively considerable impacts to the Hoover Dam-to-San Bernardino transmission line from the ISEGS project, will be reduced to less than cumulatively considerable with the implementation of Conditions of Certification **CUL-8 and CUL-9**.

6. The mitigation measures contained in the Conditions of Certification below ensure that any direct, indirect, or cumulative adverse impacts to cultural resources resulting from project-related activities will be insignificant.

CONCLUSION OF LAW

1. The Commission therefore concludes that with implementation of the Conditions of Certification below, the project will conform to all applicable laws, ordinances, regulations, and standards relating to cultural resources as set forth in the pertinent portion of **Appendix A** of this Decision and will not cause a significant environmental impact on cultural resources.

CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance (includes "preconstruction site mobilization;" "construction ground disturbance;" and "construction grading, boring, and trenching," as defined in the General Conditions for this project), the project owner shall obtain the services of a Cultural Resources Specialist (CRS), and one or more alternate CRSs, if alternates are needed. The CRS shall manage all consultation, monitoring, mitigation, curation, and reporting activities required in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resource Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility to the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner. No ground disturbance shall occur prior to CPM approval of the CRS, unless specifically approved by the BLM's Authorized Officer and the CPM. Approval of a CRS may be denied or revoked for non-compliance on this or other projects.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the BLM's Authorized Officer and the CPM that their training and background conform to the U.S. Secretary of Interior Guidelines, as published in the Code of Federal Regulations, 36 CFR Part 61. In addition, the CRS shall have the following qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field; and
2. At least three years of archaeological or historic, as appropriate, resource mitigation and field experience in California.

The resume of the CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS on referenced projects, and demonstrate that the CRS has the appropriate education and experience to accomplish the cultural resource tasks that must be addressed during ground disturbance, grading, construction, and operation.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or
2. an AS or AA degree in anthropology, archaeology, historical archaeology or a related field, and four years experience monitoring in California; or
3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology or a related field, and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialists, e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the BLM's Authorized Officer and the CPM for approval.

Verification: At least 45 days prior to the start of ground disturbance, the project owner shall submit the resume for the CRS, and alternate(s), if desired, to the BLM's Authorized Officer and the CPM for review and approval.

1. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the BLM's Authorized Officer and the CPM for review and approval. At the same time, the project owner shall also provide to the approved new CRS the AFC and all cultural documents, field notes, photographs, and other cultural materials generated by the project. If there is no alternate CRS in place to conduct the duties of the CRS, a previously approved monitor may serve in place of a CRS so that construction may continue up to a maximum of 3 days without a CRS. If cultural resources are discovered, then construction will remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.
2. At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resource monitoring required by this Condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the BLM's Authorized Officer and the CPM identifying the CRMs and attesting to the qualifications of the CRMs, at least five days prior to the CRMs beginning on-site duties.
3. At least 10 days prior to beginning tasks, the resume(s) of any additional technical specialists shall be provided to the BLM's Authorized Officer and the CPM for review and approval.
4. At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the BLM's Authorized Officer and the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources Conditions.

CUL-2 Prior to the start of ground disturbance, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, and confidential cultural resources reports for the project. The project owner shall also provide the CRS, the BLM's Authorized Officer, and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The BLM's Authorized Officer and the CPM shall review submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless specifically approved by the BLM's Authorized Officer and the CPM.

If construction of the project would proceed in phases, maps and drawings, not previously provided, shall be submitted prior to the start of each phase. Written notification identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

At a minimum, the CRS shall consult weekly with the project construction manager to confirm area(s) to be worked during the next week, until ground disturbance is completed, and the project owner shall ensure that the project construction manager is available for such weekly consultations.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless specifically approved by the BLM's Authorized Officer and the CPM.

Verification: At least 40 days prior to the start of ground disturbance, the project owner shall provide the AFC, data responses, and confidential cultural resource documents to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The BLM's Authorized Officer and the CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

If there are changes to any project related-footprint, revised maps and drawings shall be provided at least 15 days prior to start of ground disturbance and construction for those changes.

If project construction is phased, if not previously provided, the project owner shall submit the subject maps and drawings 15 days prior to each phase.

On a weekly basis during ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, email, or fax.

Within five days of identifying changes, the project owner shall provide written notice of any changes to scheduling of construction phase.

CUL-3 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or under the direction of the CRS, to the BLM's Authorized Officer and the CPM for review and approval. The CPM shall provide the project owner with a model CRMMP to adapt for project use. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner. Copies of the CRMMP shall reside with the CRS, alternate CRS, each monitor, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless specifically approved by the BLM's Authorized Officer and the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The Conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the Conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."
2. A proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the local prehistory and history of the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. The research design shall specify that the preferred treatment strategy for any buried archaeological deposits is avoidance. A mitigation plan shall be prepared for any NRHP-eligible resource (as determined by the BLM's Authorized Officer) or any CRHR-eligible resource (as determined by the CPM), impacts to which cannot be avoided. A prescriptive treatment plan may be included in the CRMMP for limited data types.
3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground disturbance and post-ground–disturbance analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.

5. A description of the manner in which Native American observers or monitors will be included, the procedures to be used to select them, and their role and responsibilities.

6. A description of all impact avoidance measures (such as flagging or fencing), to prohibit or otherwise restrict access to sensitive resource areas that may be found during construction and/or operation and may subsequently need to be avoided, and identification of the areas where these measures are to be implemented. The description shall address how these measures would be implemented and how long they would be needed to protect the resources from project-related effects.

7. A statement that all cultural resources encountered shall be recorded on a DPR form 523 and mapped and photographed. In addition, all archaeological materials collected as a result of the archaeological investigations (survey, testing, and data recovery) shall be curated in accordance with the State Historical Resources Commission's "Guidelines for the Curation of Archaeological Collections," into a retrievable storage collection in a public repository or museum.

8. A statement that the project owner will pay all curation fees for artifacts recovered and for related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.

9. A statement that the CRS has access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resource materials that are encountered during ground disturbance and that cannot be treated prescriptively.

10. A description of the contents and format of the Cultural Resource Report (CRR), which shall be prepared according to ARMR Guidelines.

Verification: Upon approval of the CRS proposed by the project owner, the CPM will provide to the CRS an electronic copy of the model CRMMP.

At least 30 days prior to the start of ground disturbance, the project owner shall submit the subject CRMMP to the BLM's Authorized Officer and the CPM for review and approval. Ground disturbance may not commence until the CRMMP

is approved, unless specifically approved by the BLM's Authorized Officer and the CPM.

At least 30 days prior to the start of ground disturbance, a letter shall be provided to the BLM's Authorized Officer and the CPM indicating that the project owner agrees to pay curation fees for any materials collected as a result of the archaeological investigations (survey, testing, data recovery).

CUL-4 The project owner shall submit the Cultural Resources Report (CRR) to the BLM's Authorized Officer and the CPM for approval. The CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The CRR shall report on all field activities related to the implementation of the CRMMP including dates, times and locations, findings, samplings, and analyses. All survey reports, Department of Parks and Recreation (DPR) 523 forms, and additional research reports not previously submitted to the California Historic Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as an appendix to the CRR.

If the project owner requests a suspension of ground disturbance and/or construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the BLM's Authorized Officer and the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until ground disturbance and/or construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the BLM's Authorized Officer and the CPM for review and approval at the same time as the withdrawal request.

Verification: Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the CRR to the BLM's Authorized Officer and the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

Within 90 days after completion of ground disturbance (including landscaping), the project owner shall provide to the BLM's Authorized Officer and the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, to accept cultural materials, if any, from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

Within 10 days after CPM approval of the CRR, the project owner shall provide documentation to the BLM's Authorized Officer and the CPM that copies of the CRR have been provided to the SHPO, the CHRIS, the curating institution, if archaeological materials were collected, and to the Chairperson(s) of any Native American groups requesting copies of project-related reports.

Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the BLM's Authorized Officer and the CPM for review and approval.

CUL-5 Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment at the project site and on the linear facilities. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance, including landscaping, is completed. The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. A discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;
4. A discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during construction, and the range of variation in the appearance of such deposits;
5. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt construction in the area of a discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;
6. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;
7. An informational brochure that identifies reporting procedures in the event of a discovery;
8. An acknowledgement form signed by each worker indicating that they have received the training; and
9. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance shall occur prior to implementation of the WEAP program, unless such activities are specifically approved by the BLM's Authorized Officer and the CPM.

Verification: At least 30 days prior to the beginning of ground disturbance, the CRS shall provide the training program draft text and graphics and the informational brochure to the BLM's Authorized Officer and the CPM for review and approval, and the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

On a monthly basis, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of persons who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 The project owner shall ensure that construction is immediately halted should anyone discover buried archaeological materials on the project site or linear facilities (Discovery). Archaeological materials may include, but are not limited to, such items as whole or fragmentary flaked or ground stone tools, stone flaking debris, discolored, fire-altered rock, animal bone, charcoal, ash, discolored, burned earth, rocks and minerals not common to the project site, and fragments of ceramic, glass, or metal. In the event of such a Discovery, the project owner shall ensure the immediate notification of the CRS, who shall either evaluate the NRHP and CRHR eligibility of the Discovery, in person, on the project site, or supervise the evaluations that a CRM or an appropriate cultural resources technical specialist would make of the historical significance of the Discovery, also in person, on the project. The recommendations of significance shall be substantiated by and reported to the BLM's Authorized Officer and the CPM by the CRS. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor, in a manner agreed to by the CRS.

In the event cultural resources that are over 50 years of age or that may be considered NRHP- or CRHR-eligible are found, or impacts to such resources can be anticipated, construction shall be halted or redirected in the immediate vicinity of the Discovery sufficient to ensure that the resource is protected from further impacts. The halting or redirection of construction shall remain in effect until either the CRS, a CRM, or appropriate cultural resources technical specialist has made evaluations of the historical significance of the Discovery, and all of the following have also occurred:

1. The CRS has notified the project owner, and the BLM's Authorized Officer and the CPM have been notified within 24 hours of the Discovery, or by Monday morning if the cultural resources Discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the Discovery (or changes in character or attributes), the action taken (i.e. work stoppage or redirection), recommendations of eligibility, and recommendations for mitigation of any cultural resources

Discoveries, whether or not a determination of significance has been made.

2. The CRS has ensured completion of field notes, measurements, and photography for a DPR 523 primary form. The "Description" entry of the 523 form shall include a recommendation on the significance of the find. The project owner shall submit completed forms to the BLM's Authorized Officer and the CPM.

3. The CRS, the project owner, and the BLM's Authorized Officer and the CPM have conferred, and the BLM's Authorized Officer and the CPM have concurred with the recommended eligibility of the Discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

4. The CRS, the BLM's Authorized Officer, and the CPM have conferred, and the BLM's Authorized Officer and the CPM have determined whether the Discovery reveals new information about the subsurface archaeological character of the project site that warrants the initiation of monitoring for portions of the project site.

5. When the BLM's Authorized Officer and the CPM make a determination that a Discovery does reveal new information about the subsurface archaeological character of the project site that warrants the initiation of monitoring for portions of the project site, the BLM's Authorized Officer and the CPM shall provide notification, by letter or e-mail, to the project owner and the CRS, where on the project site monitoring shall be necessary and why, and notification that **CUL-7** shall be implemented for the subject portions of the project site.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the BLM's Authorized Officer, the CPM, and the CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt construction activities in the vicinity of a cultural resources Discovery, and that the project owner shall ensure that the CRS notifies the BLM's Authorized Officer and the CPM within 24 hours of a Discovery, or by Monday morning if the cultural resources Discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

Completed DPR form 523s shall be submitted to the BLM's Authorized Officer and the CPM for review and approval no later than 24 hours following the notification of the BLM's Authorized Officer and the CPM, or 48 hours following the completion of data recordation/recovery, whichever is more appropriate for the subject cultural material.

CUL-7 If there is a discovery of archaeological material, and after the BLM's Authorized Officer and the CPM notify the project owner and the CRS that

the initiation of monitoring is necessary for portions of the project site or linear facilities, the project owner shall ensure that the CRS, alternate CRS, or CRMs shall monitor full time on the portions of the project site and linear facilities which the BLM's Authorized Officer and the CPM may specify, and ground disturbance full time on the portions of the laydown areas or other ancillary areas which the BLM's Authorized Officer and the CPM may also specify, to ensure there are no impacts to further undiscovered resources and to ensure that newly found resources are not further impacted in an unanticipated manner.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of all earth-moving activities on the portions of the construction site or the linear facility routes which the BLM's Authorized Officer and the CPM may specify for as long as the activities are ongoing. Full-time archaeological monitoring shall require one monitor per active earthmoving machine working in archaeologically sensitive areas, as determined by the CRS in consultation with the BLM's Authorized Officer and the CPM. If an excavation area is too large for one monitor to effectively observe the soil removal, one or more additional monitors shall be retained to observe the area.

In the event that the CRS determines that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the BLM's Authorized Officer and the CPM for review and approval prior to any change in the level of monitoring.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered.

On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resource activities and any instances of non-compliance with the Conditions and/or applicable LORS. Copies of the daily logs shall be provided to the BLM's Authorized Officer and the CPM by the CRS as directed by the BLM's Authorized Officer and the CPM. The CRS shall use these logs to compile a monthly summary report on the progress or status of cultural resources-related activities. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended. The CRS or alternate CRS shall report daily to the BLM's Authorized Officer and the CPM on the status of cultural resources-related activities at the project site, unless reducing or ending daily reporting is requested by the CRS and approved by the BLM's Authorized Officer and the CPM.

The CRS, at his or her discretion, or at the request of the BLM's Authorized Officer or the CPM, may informally discuss cultural resource

monitoring and mitigation activities with Energy Commission technical staff.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS, or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these Conditions.

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner shall notify the BLM's Authorized Officer and the CPM by telephone or e-mail within 24 hours. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the BLM's Authorized Officer and the CPM.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered. Informational lists of concerned Native Americans and Guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored.

Verification: At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of the form to be used as a daily monitoring log.

Daily, the CRS shall provide a statement that "no cultural resources over 50 years of age were discovered" to the BLM's Authorized Officer and the CPM as an e-mail or in some other form acceptable to the BLM's Authorized Officer and the CPM. If the CRS concludes that daily reporting is no longer necessary, a letter or e-mail providing a detailed justification for the decision to reduce or end daily reporting shall be provided to the BLM's Authorized Officer and the CPM for review and approval at least 24 hours prior to reducing or ending daily reporting.

On a monthly basis, while monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS. Copies of daily logs shall be retained by the project owner and made available for audit by the BLM's Authorized Officer and the CPM.

At least 24 hours prior to implementing a proposed change in monitoring level, documentation justifying the change shall be submitted to the BLM's Authorized Officer and the CPM for review and approval.

CUL-8 Prior to the dismantling, by any party, of any portion of the Hoover Dam-to-San Bernardino transmission line (CA-SBR-10315H) located with the

boundaries of the project site, the project owner shall obtain the services of an architectural historian. The project owner shall provide the BLM's Authorized Officer and the CPM with the name and resume of the architectural historian. No ground disturbance shall occur prior to CPM approval of the architectural historian, unless specifically approved by the BLM's Authorized Officer and the CPM.

The resume for the architectural historian shall include names and telephone numbers of contacts familiar with the architectural historian's work and all information needed to demonstrate that the architectural historian has the following qualifications:

1. meets the Secretary of Interior's Professional Standards for architectural history;
2. has at least three years experience in recording twentieth-century industrial structures; and
3. has completed at least one recordation project within the past five years involving coordination with the National Park Service's Heritage Documentation Program (HDP).

Verification: At least 90 days prior to the dismantling of any portion of the Hoover Dam-to-San Bernardino transmission line located within the boundaries of the project site, the project owner shall submit the name and resume of the selected architectural historian to the BLM's Authorized Officer and the CPM for review and approval.

At least 75 days prior to the dismantling of any portion of the Hoover Dam-to-San Bernardino transmission line located within the boundaries of the project site, the project owner shall confirm in writing to the BLM's Authorized Officer and the CPM that the approved architectural historian is available for onsite work and provide a date by which the architectural historian will undertake the HAER-type documentation of the tower types and the cabling system of the portion of the Hoover Dam-to-San Bernardino transmission line located within the boundaries of the project site.

CUL-9 Prior to the dismantling, by any party, of any portion of the Hoover Dam-to-San Bernardino transmission line (CA-SBR-10315H) located within the boundaries of the project site, the project owner shall ensure that the approved architectural historian prepares HAER-type documentation of the historic context and historic setting of the resource, and recordation of those physical parts of the Hoover Dam-to-San Bernardino transmission line that are located within the boundaries of the project site. The project owner shall ensure that the architectural historian consults with the HABS/HAER Coordinator in the Pacific West Regional Office of the HDP, in Oakland, and complies with the Coordinator's guidance on the extent and content of documentation appropriate for the Hoover Dam-to-San Bernardino transmission line, as a historical resource under CEQA and as

a resource eligible for inclusion in the National Register of Historic Places, and on the format and materials to be used in the documentation. No dismantling of the Hoover Dam-to-San Bernardino transmission line located within the boundaries of the project area shall occur prior to the completion, by the architectural historian, of the recording, in the field, of the historic setting and the portion of the line located within the boundaries of the project site, and the submission to and approval by the BLM's Authorized Officer and the CPM of the draft HAER-type documentation of the Hoover Dam-to-San Bernardino transmission line, unless specifically allowed by the BLM's Authorized Officer and the CPM.

Verification: At least 60 days prior to the dismantling, by any party, of any portion of the Hoover Dam-to-San Bernardino transmission line located within the boundaries of the project site, the project owner shall submit to the BLM's Authorized Officer and the CPM a letter or memorandum from the architectural historian detailing the scope of the HDP-recommended documentation of the resource.

At least 30 days prior to the dismantling, by any party, of any portion of the Hoover Dam-to-San Bernardino transmission line located within the boundaries of the project site, the project owner shall provide a copy of the draft HAER-type documentation of the resource to the BLM's Authorized Officer and the CPM for review and approval.

Within 90 days after completion of ground disturbance (including landscaping) the project owner shall include in an appendix to the CRR copies of the transmittal letters for the submission of copies of the final HAER-type documentation of the portion of the Hoover Dam-to-San Bernardino transmission line located within the boundaries of the project site to the California State Library and to at least two local libraries in San Bernardino County, and a copy of the letter of acceptance of the final HAER documentation by the Library of Congress, if accepted by that repository.

Alternately, at least 150 days prior to the dismantling, by any party, of any portion of the Hoover Dam-to-San Bernardino transmission line located within the boundaries of the project site, the project owner may submit to the BLM's Authorized Officer and the CPM, for review and approval, a copy of final HAER-type documentation of the portion of the Hoover Dam-to-San Bernardino transmission line located within the boundaries of the project site produced by any party, that meets HAER-type standards. If the project owner chooses this alternative, within 90 days after completion of ground disturbance (including landscaping), the project owner shall include in an appendix to the CRR copies of the transmittal letters for the submission of copies of the alternative final HAER-type documentation to the California State Library and to at least two local libraries in San Bernardino County.

CUL-10 If fill soils must be acquired from a non-commercial borrow site or disposed of to a non-commercial disposal site, unless less-than-five-year-old surveys of these sites for archaeological resources are documented to and approved by the BLM's Authorized Officer and the CPM, the CRS shall survey the borrow and/or disposal site(s) for cultural resources and record on DPR 523 forms any that are identified. When the survey is completed, the CRS shall convey the results and recommendations for further action to the project owner, the BLM's Authorized Officer, and the CPM, who will determine what, if any, further action is required. If the BLM's Authorized Officer and the CPM determine that significant archaeological resources that cannot be avoided are present at the borrow site, all these conditions of certification shall apply. The CRS shall report on the methods and results of these surveys in the CRR.

Verification: As soon as the project owner knows that a non-commercial borrow site and/or disposal site will be used, he/she shall notify the CRS and CPM and provide documentation of previous archaeological survey, if any, dating within the past five years, for CPM approval.

In the absence of documentation of recent archaeological survey, **at least 30 days prior** to any soil borrow or disposal activities on the non-commercial borrow and/or disposal sites, the CRS shall survey the site/s for archaeological resources. The CRS shall notify the project owner, the BLM's Authorized Officer, and the CPM of the results of the cultural resources survey, with recommendations, if any, for further action.

D. GEOLOGY, PALEONTOLOGY, AND MINERALS

This topic summarizes the evidence on potential geologic hazards that could affect project operation, including faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, flooding, tsunamis, and seiches. It also reviews evidence on whether project-related activities could result in adverse impacts to significant geologic, mineral, or paleontological resources and, if so, whether the project's potential impacts will be adequately mitigated. The parties did not dispute any matters related to this topic. (12/14/09 RT 305; Ex. 1, § 5.4, Appendix 5.4A; Ex. 1, § 5.8, Appendix 5.8A; Exs. 57, 65; Ex. 300, § 6.15.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Geologic Hazards

The ISEGS site is located at the east end of the Mojave Desert geomorphic province in the Ivanpah Valley near the California-Nevada border. The general area is dominated by broad alluviated basins that are mostly aggrading surfaces receiving non-marine continental deposits from adjacent uplands. The site is situated on a gently sloping rise (elevation between 3,000 feet on the west and 2,800 on the east) on the west flank of the Ivanpah Valley, which is bounded by non water-bearing rocks of the Clark Mountains on the northwest, the Ivanpah Range on the west, and the New York Mountains on the southeast. The area is underlain by Quaternary age alluvial sediments. (Ex. 1, § 5.4.3; Ex. 300, pp. 6.15-5 to 6.15-7.)

Seismic Activity

The fault activity maps published by the California Division of Mines and Geology (CDMG), the U.S. Geological Survey (USGS), and the California Geological Survey (CGS) show that the likelihood of strong seismic ground shaking at the ISEGS site is low to medium. The 3007 California Building Code (CBC) designates the site vicinity as Seismic Zone 3, which requires the implementation of specific engineering safeguards to withstand potential seismicity. See the **Facility Design** section of this Decision. The site is not considered an Alquist-Priolo Fault Zone since there are no known active faults that cross the boundary of new construction on the site or in the vicinity of the gas pipeline. (Ex. 300, pp. 6.15-12 to 6.15-13; Ex. 1, § 5.4.3.4.2.)

Several potentially active faults related to regional strike-slip faulting to the west and north, as well as to extensional tectonics in the Great Basin and eastern Mojave Desert, are present within 100 miles of the ISEGS project area. The closest mapped active faults are the Death Valley Fault Zone and the Garlock Fault located approximately 51 miles to the west. Movement on the north-northwest-striking Death Valley Fault is normal, related to extensional tectonics in the Great Basin, coupled with right-lateral strike-slip, related to San Andreas-style transform faulting. The Garlock Fault is a major east-west-striking, left-lateral strike-slip fault, also associated with regional transform faulting to the west. (Ex. 1, § 5.4.3.3; Ex. 300, pp. 6.15-12, 6.15-15.)

Staff's **Geology, Paleontology and Minerals Table 2**, below, lists the primary known active faults with Holocene age (less than 10,000 years) activity, their distance from the project site, and the expected earthquake magnitude and intensity during a maximum magnitude earthquake on each fault. There are several older faults in the area that are not considered active, including the Stateline Fault, located 4.5 miles to the northeast along the California-Nevada border, which had movement in the early to middle Pleistocene (700,000 to 1,600,000 years). (Ex. 300, pp. 6.15-9, 6.15-12.)

Geology, Paleontology and Minerals Table 2
Active Faults in the Project Area

Fault Name, Zone or System	Approximate Distance (mi [km])	Estimated Maximum Earthquake Event		
		Maximum Earthquake Magnitude (Mw)	Peak Site Surface Acceleration (g)	Estimated Site Intensity (Modified Mercali Scale)
Death Valley (South)	51.3 (82.5)	7.1	0.080	VII
Garlock (East)	51.3 (82.6)	7.5	0.098	VII
Owl Lake	67.0 (107.9)	6.5	0.047	VI
Pisgah-Bullion Mountain – Mesquite Lake	76.8 (123.6)	7.3	0.065	VI
Death Valley (Graben)	79.6 (128.1)	7.1	0.069	VI
Panamint Valley	80.9 (130.2)	7.4	0.065	VI
Calico – Hidalgo	84.1 (135.4)	7.3	0.060	VI
Landers	92.3 (148.6)	7.3	0.056	VI
Emerson South – Copper Mountain	93.3 (150.1)	7.0	0.047	VI
Gravel Hills – Harper Lake	94.4 (151.9)	7.1	0.050	VI
Blackwater	94.6 (152.3)	7.1	0.049	VI

Fault Name, Zone or System	Approximate Distance (mi [km])	Estimated Maximum Earthquake Event		
		Maximum Earthquake Magnitude (Mw)	Peak Site Surface Acceleration (g)	Estimated Site Intensity (Modified Mercali Scale)
Johnson Valley (Northern)	97.9 (157.6)	6.7	0.039	V
Tank Canyon	98.7 (158.9)	6.4	0.040	V
Lenwood-Lockhart-Old Woman Springs	99.2 (159.6)	7.5	0.059	VI

Source: Ex. 300, p. 6.15-9.

Data available from the USGS and the CGS for the twentieth century show that there were 23 recorded earthquakes with magnitudes ranging from 5.0 to 7.1 within a 100-mile radius of the site. The evidentiary record does not provide information on seismic activity since the year 1999; however, the potential of surface rupture at the project site is considered to be very low since no faults are known to have ruptured the ground surface within the site footprint. (Ex. 300, pp. 6.15-14 to 6.15-15, Geology, Paleo, Minerals Table 3; Ex. 1, § 5.4.3.4.1.)

To ensure that ISEGS is designed according to the seismic engineering requirements established by the CBC, Condition of Certification **GEO-1** requires the project owner to complete a design-level Soils Engineering Report to confirm the soil profile at the site and to provide appropriate seismic design parameters.

Liquefaction

Liquefaction is a condition where in a cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake. Existing data from water wells in the Ivanpah Valley have shown high historic groundwater levels. Applicant's Initial Geotechnical Report provides information from only two boring sites within the Ivanpah 2 boundary, indicating that groundwater depth is at least 80 feet beneath the ground surface. The medium dense to very dense sandy and gravelly soils encountered in the Ivanpah 2 borings coupled with a groundwater table below 80 feet would indicate no potential for liquefaction; however, groundwater depth on the entire ISEGS site is not precisely known. To ascertain accurate information on groundwater depth, Condition of Certification **GEO-1** requires the Soils Engineering Report to include definitive data on groundwater depths and bedrock, as well as other geologic conditions consistent with CBC requirements. (Ex. 300, pp. 6.15-7, 6.15-15; Ex. 1, § 5.4.3.4.3, Appendix 5.4A.)

Dynamic Compaction and Hydrocompaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events, which causes a decrease in soil volume, resulting in settlement of overlying structural improvements. Hydrocompaction or hydro-collapse generally occurs in young soils that were deposited rapidly in a saturated state, most commonly by a flash flood. The medium dense to very dense granular soils encountered in the Ivanpah 2 borings would not be susceptible to dynamic compaction or hydrocompaction during an earthquake; however it is not possible to assess the soil compaction potential for the entire ISEGS site without site-specific geotechnical exploration. Condition **GEO-1** requires the Soils Engineering Report to address the potential for and mitigation of the effects of soil compaction in the event of an earthquake. 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. (Ex. 300, pp. 6.15-7, 6.15-15 to 6.15-16; Ex. 1, Appendix 5.4A.)

Subsidence

Consolidation settlement may occur when areas containing compressible soils are subjected to surcharge loads. The coarse-grained soils encountered in the Ivanpah 2 borings are not considered highly sensitive to surcharge loading; however, it is not possible to assess the potential for consolidation settlement for the entire ISEGS site without site-specific geotechnical exploration. Condition **GEO-1** requires the Soils Engineering Report to address the potential for consolidation settlement and the necessary mitigation measures. Mitigation is normally accomplished by over-excavation and replacement of the surifical materials, or by incorporating deep foundations for deeper deposits. (Ex. 300, pp. 6.15-7, 6.15-16; Ex. 1, § 5.4.3.4.5.)

Local subsidence in the form of sinkholes was observed at the site and along the northern edge of Ivanpah Dry Lake. While sinkholes can sometimes be attributed to groundwater withdrawal as well as other causes, the cause in this case is believed to be from dehydration of clays between the soil surface and the water table resulting in a major loss of volume and the collapse of overlying soils. The potential for such shrinkage to affect structural components must be mitigated through facility design protocols consistent with the CBC. Condition **GEO-1** as well as the conditions listed in the **Facility Design** section of this Decision will ensure compliance with CBC requirements. (Ex. 1, Appendix 5.4A; Ex. 300, pp. 6.15-10, 6.15-16.)

Expansive soils

Soil expansion occurs when clay-rich soils with an affinity for water contain moisture content below their plastic limit. An increase in volume can cause movement of overlying structural improvements. Although expansion testing was not performed in the Ivanpah 2 borings, the coarse-grained, non-plastic soils encountered are not considered to be expansive. The Soils Engineering Report required by Condition **GEO-1** will investigate the potential for expansive soils at the site and describe necessary mitigation measures. Mitigation is normally accomplished by over-excavation and replacement of the expansive soils. For deep-seated conditions, deep foundations are commonly used. (Ex. 300, p. 6.15-17.)

Landslides, Flooding, Tsunamis, and Sieches

The potential for landslides at the ISEGS site is considered negligible. The Federal Emergency Management Agency has classified the site and gas pipeline route as Flood Zone D where the potential for flooding is undetermined. There is no risk of tsunamis or sieches due to the site's distance from any large bodies of water. See discussion in the **Soils and Water Resources** section of this Decision. (Ex. 300, p. 6.15-17.)

2. Mineral Resources

The ISEGS site is not currently used for mineral production, nor is it under claim, lease, or permit for production of locatable, leasable, or salable minerals. Project construction involves the removal of approximately 4,072.5 acres from potential sand and gravel production under BLM's salable mineral program. However, there is no evidence that ISEGS will affect the availability of these materials for future development in the area because sand and gravel are widely accessible throughout the Ivanpah Valley. ISEGS is required to comply with BLM regulations for the production and use of sand and gravel on public lands. (Ex. 300, pp. 6.15-17 to 6.15-18, 6.15-21.)

The project will not result in any direct or indirect impact on the production of locatable or leasable minerals outside the project boundaries. There are a variety of active mining operations in the general area but none are connected with the ISEGS property. Active mining claims exist on Limestone Hill directly adjacent to the site but there is no indication that these claims will be converted to commercial operations. The potential for a newly discovered mining claim beneath the ISEGS site is considered very low. (Ex. 300, pp. 6.15-18, 6.15-22.)

3. Paleontological Resources

Quaternary alluvial deposits underlying the project site typically contain a wide variety of vertebrate fossils. Applicant's records search revealed that significant paleontological resources have been documented in nearby Paleozoic carbonate bedrock and could be encountered during construction of the Ivanpah 3 plant and linear facilities. However, the young to intermediate age alluvium that underlies the majority of the site, as well as Pre-Cambrian metamorphic rocks located just northeast of Ivanpah 2, are considered to be of low to negligible sensitivity for paleontological resources. (Ex. 1, § 5.8.4, Appendix 5.8; Ex. 300, p. 6.15-22.)

The existence of underground paleontological resources at the site remains unknown unless encountered during excavation and construction. The Society of Vertebrate Paleontology (SVP) has established guidelines for the assessment and mitigation of impacts to newly discovered paleontological resources. (Ex. 1, §§ 5.8.2, 5.8.5.1.) We have incorporated SVP guidelines in Conditions of Certification **PAL-1** to **PAL-7**, below, to ensure that potential impacts to paleontological resources are mitigated to insignificant levels. Mitigation includes the implementation of a Paleontological Resources Monitoring and Mitigation Plan, the monitoring of earth-moving activities by a professional paleontologist, and a worker education program. (Ex. 300, pp. 6.15-22 to 6.15-23.)

4. Cumulative Impacts

Cumulative impacts can occur if impacts from development of the ISEGS project combine with those of other local or regional projects, including several proposed solar and wind development projects located within the California Desert Conservation Area, as well as on BLM land in Nevada and Arizona. However, with the exception of geologic subsidence, cumulative impacts related to geology, minerals, and paleontological resources only have the potential to occur within the boundaries of the project site.[1] Therefore, the geographic extent for cumulative impacts remains within the project site and linear facilities corridors. (Ex. 300, p. 6.15-26.)

[1] According to Staff, the project will not substantially deplete groundwater supplies or interfere with groundwater recharge to cause a net deficit in aquifer volume or a lowering of the local groundwater table level and, therefore, groundwater pumping associated with ISEGS would not contribute to subsidence in the Ivanpah Valley. See the **Soils and Water Resources** section of this Decision. (Ex. 300, p. 6.15-26.)

FINDINGS OF FACT

Based on the uncontroverted evidence, we make the following findings:

1. The ISEGS project is located in an active geologic area, which is designated Seismic Zone 3 under the California Building Code (CBC).

2. Seismic activity is the main geologic hazard at the ISEGS site.

3. Applicant's preliminary Geotechnical Engineering Study indicated that the likelihood of liquefaction, dynamic compaction, hydrocompaction, subsidence, and expansive soils occurring at the site due to seismic ground shaking is negligible; however, it was not possible to assess the potential for soil movement or settlement at the entire ISEGS site without the complete geotechnical exploration required by the CBC.

4. Condition **GEO-1** requires the ISEGS to provide a complete Soils Engineering Report as defined by the CBC and to implement appropriate engineering design measures as specified in Conditions **GEN-1**, **GEN-5**, **STRUC-1**, and **CIVIL-1** in the **Facility Design** section of this Decision.

5. The potential for landslides at the ISEGS site is considered negligible.

6. The potential for flooding at the site is undetermined according to the Federal Emergency Management Agency.

7. There is no potential for tsunamis or sieches at the site because there are no large bodies of water in the site vicinity.

8. The site is not currently used for mineral production, nor is it under claim, lease, or permit for production of locatable, leasable, or salable minerals.

9. Project construction will remove sand and gravel from potential sand and gravel production under BLM's salable mineral program but it will not affect the availability of these materials because they are widely accessible throughout the Ivanpah Valley.

10. There is no evidence that ISEGS will result in any significant impacts to mineral resources.

11. The potential for encountering paleontological resources is considered high in some portions of the ISEGS site and low in other areas of the site.

12. The ISEGS will implement several mitigation measures to avoid any significant impacts to paleontological resources including a Paleontological

13. The ISEGS will not result in cumulative geologic, mineral, or paleontological impacts in the Ivanpah Valley because the geographic extent of potential impacts remains within the project site and linear facilities corridors.

CONCLUSION OF LAW

1. The Conditions of Certification, listed below, ensure that project activities will not cause adverse impacts to geologic, mineral, or paleontological resources. In addition, Conditions **GEN-1**, **GEN-5**, **STRUC-1**, and **CIVIL-1** in the **Facility Design** section of this Decision ensure that the project will be designed and constructed to adequately withstand foreseeable geologic hazards. Compliance with the Conditions of Certification will also ensure that ISEGS conforms to all applicable laws, ordinances, regulations, and standards (LORS) related to geologic, mineral, and paleontological resources as identified in **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

Conditions of Certification **GEN-1**, **GEN-5**, **STRUC-1**, and **CIVIL-1** in the **Facility Design** section of this Decision require the Project Owner to comply with all applicable engineering geology LORS. Condition **GEO-1** and Conditions **PAL-1** through **PAL-7** are listed below.

GEOLOGY

GEO-1 The Soils Engineering Report required by Section 1802A of the 3007 California Building Code (CBC) shall specifically include: (1) laboratory test data; (2) associated geotechnical engineering analyses; and (3) a thorough discussion of the potential for liquefaction, settlement due to compressible soils, subsidence associated with shrinkage of clay soils, hydrocompaction, or dynamic compaction; and the presence of expansive clay soils. The report shall also include recommendations for ground improvement and/or foundation systems necessary to mitigate these potential geologic hazards, if present.

Verification: The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report, which addresses the potential for liquefaction; settlement due to compressible soils, groundwater withdrawal, hydrocompaction, or dynamic compaction; and the possible presence of expansive clay soils, and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and

comment by the Chief Building Official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO shall be submitted to the BLM's Authorized Officer and the Compliance Project Manager (CPM) at least 30 days prior to the start of any ground disturbance activities.

PALEONTOLOGAL RESOURCES

PAL-1 The project owner shall provide the resume and qualifications of its Paleontological Resources Specialist (PRS) to the BLM's Authorized Officer and the CPM for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain BLM's Authorized Officer and CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified PRMs. If a PRM is replaced, the resume of the replacement PRM shall also be provided to BLM's Authorized Officer and the CPM.

The resume for the PRS shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the BLM's Authorized Officer and the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the BLM's Authorized Officer and the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;

2. Ability to recognize and collect fossils in the field;

3. Local geological and biostratigraphic expertise;

4. Proficiency in identifying vertebrate and invertebrate fossils; and

5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors (PRMs) to monitor as he or she deems necessary on the project. PRMs shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or
- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification: (1) At least 60 days prior to the start of ground disturbance, the project owner shall submit the resume and statement of availability of its designated PRS for on-site work.

(2) At least 20 days prior to the start of ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by **Condition PAL-1**. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the BLM's Authorized Officer and the CPM. Any additional letter and resume shall be provided to the BLM's Authorized Officer and the CPM no later than seven days prior to the new monitor's beginning on-site duties.

(3) Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to BLM's Authorized Officer and the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS, BLM's Authorized Officer and the CPM, for approval, maps and drawings showing the footprint of the power plants, construction lay down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS, BLM's Authorized Officer and CPM. The site grading plan and the plan and profile drawings for the utility lines are acceptable for this purpose. The plan drawings shall show the location, depth, and extent of all ground disturbances and be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the project or its linear facilities change, the project owner shall provide maps and drawings reflecting those changes to the PRS, the BLM's Authorized Officer, and the CPM.

If construction of the ISEGS project proceeds in phases, maps and drawings may be submitted prior to the start of each power plant phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS, the BLM's Authorized Officer and the CPM. Before work commences on each of the power plants, the

project owner shall notify the PRS, the BLM's Authorized Officer and the CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week, and until ground disturbance is completed.

Verification: (1) At least 30 days prior to the start of ground disturbance for each phase of the project, the project owner shall provide the maps and drawings to the PRS, BLM's Authorized Officer and CPM.

(2) If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS, BLM's Authorized Officer and CPM at least 15 days prior to the start of ground disturbance for each phase of the project.

(3) If there are changes to the scheduling of the construction phases of each power plant, the project owner shall submit a letter to BLM's Authorized Officer and the CPM within 5 days of identifying the changes.

PAL-3 If after review of the plans provided pursuant to **Condition PAL-2**, the PRS determines that materials with moderate, high, or unknown paleontological sensitivity could be impacted, the project owner shall ensure that the PRS prepares, and the project owner submits to BLM's Authorized Officer and the CPM for review and approval, a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to paleontological resources. Approval of the PRMMP by BLM's Authorized Officer and the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities, and may be modified with BLM's Authorized Officer and CPM approval. This document shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, BLM's Authorized Officer and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP 1995) and shall include, but not be limited, to the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the conditions of certification;

3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;

6. A discussion of procedures to be followed in the event of a fossil discovery, halting construction, resuming construction, and how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the Paleontological Conditions of Certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to BLM's Authorized Officer and the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 If after review of the plans provided pursuant to **Condition PAL-2**, the PRS determines that materials with moderate, high, or unknown paleontological sensitivity could be impacted then, prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly training approved by the BLM Authorized Officer and the CPM for the following workers: project managers, construction supervisors, foremen and general workers who work with or operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive areas prior to receiving worker training approved by the BLM Authorized Officer and the CPM. Worker training shall consist of an initial in-person PRS training during the project kick-off, for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other training for topics of concern. No ground disturbance shall occur prior to BLM's Authorized Officer and CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontological sensitivity;

3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;

5. An informational brochure that identifies reporting procedures in the event of a discovery;

6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification: (1) At least 30 days prior to the start of ground disturbance, the project owner shall submit to the BLM's Authorized Officer and the CPM the proposed WEAP, including the brochure with the set of reporting procedures for workers to follow.

(2) At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the BLM's Authorized Officer and the CPM for approval if the project owner is planning to use a video for interim training.

(3) If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to BLM's Authorized Officer and the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to BLM's Authorized Officer and CPM authorization.

(4) In the monthly compliance report (MCR), the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of BLM's Authorized Officer and the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to BLM's Authorized Officer and the CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to BLM's Authorized Officer and the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with BLM's Authorized Officer and the CPM at any time.

3. The project owner shall ensure that the PRS notifies BLM's Authorized Officer and the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.

4. For any paleontological resources encountered, either the project owner or the PRS shall notify BLM's Authorized Officer and the CPM within 24 hours, or Monday morning in the case of a weekend event where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities, and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontological resource monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by BLM's Authorized Officer and the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, BLM's Authorized Officer and the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all

paleontological resource materials encountered and collected during project construction.

Verification: The project owner shall maintain in his/her compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of BLM Authorized Officer- and CPM-approved paleontological resource report (see **Condition PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the BLM's Authorized Officer and the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information, and submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the BLM's Authorized Officer and the CPM.

result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to BLM's Authorized Officer and the CPM.

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The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to BLM's Authorized Officer and the CPM.

VII. LOCAL IMPACT ASSESSMENT

In the following sections of this Decision, we review whether the ISEGS will result in significant local impacts on nearby population centers, including an excessive burden on community services, unmitigated noise, increased traffic congestion, and/or adverse visual effects. These potential impacts are discussed under the technical topics of land use, socioeconomics, noise, traffic and transportation, and visual resources.

A. LAND USE

SUMMARY AND DISCUSSION OF THE EVIDENCE

According to CEQA Guidelines [Cal. Code Regs., tit. 14, §§ 15000 et seq., Appen. G, §§ II, IX, XVI], a project results in significant land use impacts if it would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
- Conflict with existing zoning for agricultural use or a Williamson Act contract.
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses.
- Physically disrupt or divide an established community.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project. This includes, but is not limited to, a General Plan, community or specific plan, local coastal program, airport land use compatibility plan, or zoning ordinance.
- Create individual environmental effects which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts. (Ex. 300, p. 6.5-9.)

Local ordinances and policies applicable to the project include the San Bernardino County General Plan, and the San Bernardino County 2007 Development Code. Applicable federal policies and regulations are the California Desert Conservation Area (CDCA) Plan, Northern and Eastern Mojave (NEMO) Desert Management Plan, Code of Federal Regulations Title 40, § 1508.27, Code of Federal Regulations Title 43, §§1610.5-3, 2800, and the Federal Land Policy and Management Act (1976) (Ex. 300, p. 6.5-3.)

1. The Site

The proposed ISEGS project would be located in the Mojave Desert, in San Bernardino County, 3.1 miles west of the California/Nevada border on public land managed by the BLM. The project site is west of Ivanpah Dry Lake and north of I-15. The project study area includes land that is designated for use as Utility Corridors (Corridors D and BB) in the CDCA Plan. The town of Primm, Nevada (population 436), is located about 4.5 miles northeast of the project site. Edwards Air Force Base is located 145 miles west-southwest of the site.

Interstate 15 (I-15) provides access from southern California to Nevada. I-15 is located to the east of the project area and crosses into Nevada approximately 4 miles northeast of the project site. State Route (SR) 164 intersects I-15 just south of the project area. The I-15 Yates Well Road northbound and southbound off-ramps provide access to the project site by way of Colosseum Road, an existing road that is paved to the Primm Valley Golf Club, but unpaved the remainder of its length. Primm Valley Golf Club, a public course, is located about 0.5 mile east of the Ivanpah 1 site boundary.

The Ivanpah Dry Lake is located approximately 1.6 miles east of the project site and covers approximately 35 square miles. This area is open to non-motorized vehicles and is a popular destination for recreational activities such as land sailing, archery, and kite buggies. The area also provides diverse recreational and scenic opportunities for off-highway vehicle use. (Ex. 300, pp. 6.5-3 – 6.5-4.)

Existing land uses and General Plan/Zoning designations for the project features are summarized in **Land Use Table 1**, below.

LAND USE Table 1
Existing Land Uses and General Plan Designations

Project Component	Existing Land Uses	Land Management or General Plan Land Use and Zoning Designations
Site Vicinity	SCE 115kV transmission line is located adjacent to the site boundary in a southwest to northeast orientation. The Kern River Gas Transmission Company line is located less than a half mile from the Ivanpah 3 boundary. Both utilities are within designated Utility Corridors for major utilities.	**BLM** Multiple-Use Class L Limited Use Designated Utility corridor **San Bernardino County General Plan and** **Development Code Land Use Zones** Resource Conservation (RC)
ISEGS Site	The project site is mostly undeveloped, vacant land. Existing transmission lines cross the project site in a southwest to northeast orientation between Ivanpah 1 and Ivanpah 2. These transmission lines exist within Utility Corridor BB, a two-mile wide corridor approved in the CDCA Plan for use for transmission lines, pipelines, and other linear utilities. The project site also covers portions of Utility Corridor D. Colosseum Road passes through the southeast portion of Ivanpah 2 and travels in a west to southwesterly direction. Unpaved dirt roads also cross the project site, some of which are located adjacent to the transmission lines. No additional development is present on the site.	**BLM** Multiple-Use Class L Limited Use Designated Utility corridor **San Bernardino County General Plan and** **Development Code Land Use Districts** Resource Management District and Resource Conservation (RC)
Gas Line	Onsite and offsite gas lines are located on structurally undeveloped land. The Ivanpah 1 gas line would cross under existing transmission lines. The gas lines would cross an existing unpaved road.	**BLM** Multiple-Use Class L Limited Use **San Bernardino County General Plan and** **Development Code Land Use Districts** Resource Management District and Resource Conservation (RC)
Transmission Lines	Onsite and offsite transmission lines would be located for the most part within the site boundary, those linears that extend outside of the site boundary are located within existing rights-of-way.	**BLM** Multiple-Use Class L Limited Use **San Bernardino County– General Plan and** **Development Code Land Use Districts** Resource Management District and Resource Conservation (RC)
Ex. 300, p. 6.5-7.		

2. Potential Impacts

a. Conversion of Farmland

No agricultural uses or properties are found within one mile of the proposed project site that are identified as Unique Farmland, or Farmland of Statewide Importance; there are no lands mapped as Important Farmlands. No land within one mile of the proposed project site is subject to a Williamson Act contract.

Neither the construction nor operation of the proposed project would result in any impacts to existing agricultural operations or foreseeable future agricultural use. Therefore, the proposed project would not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts. The project would have no impact with respect to farmland conversion. (Ex. 300, p. 4.5-10.)

b. Division of Existing Community

The project would not physically divide an established community because the power plant project site and linear features would be located on undeveloped public lands in unincorporated San Bernardino County and would not be located within or near an established community. Neither the size nor the nature of the project would result in a physical division or disruption of an established community, no new physical barriers would be created by the project. (Ex. 300, p. 6.5-11.)

c. Conflict with Habitat or Conservation Plan

The project site is in the general area addressed by the United States Fish and Wildlife Service (USFWS) Desert Tortoise Recovery Plan and Critical Habitat designation. The recovery plan describes a strategy for recovery and delisting of the desert tortoise. In the **Biological Resources** section of this Decision we find that impacts to the Desert Tortoise are mitigated to less than significant levels. The project is therefore consistent with the Recovery Plan. (Ex. 300, p. 6.5-11.)

3. Cumulative Impacts

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the

incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects [Cal. Code Regs., tit. 14, § 15065(a)(3).]

Local cumulative impacts would occur if ISEGS project impacts combined with impacts of projects located within the Ivanpah Valley. The Ivanpah Valley region itself is currently experiencing rapid development, both in California and in Nevada, which will likely result in new residential, commercial, and industrial land uses.

Regional cumulative impacts could occur as a result of implementation of the ISEGS project in conjunction with future solar and wind development projects that are currently proposed on over one million acres of the California Desert Conservation Area (CDCA), as well as on BLM land in Nevada and Arizona.

Development of the ISEGS project would preclude and in some cases, unduly restrict existing and future multiple uses such as recreation, wildlife habitat, livestock grazing, and open space on 3,582 acres of public land designated "Multiple Use Class L" (see below, "Consistency with LORS"). Land use impacts of the ISEGS project, when combined with impacts of the other foreseeable projects, the most significant of which include the FirstSolar photovoltaic project, the Primm Solar Generating Plant proposed on 2,500 acres south of Primm, Nevada, two wind power projects proposed on 2,330 and 3,360 acres sites on Mountain Pass, and the Southern Nevada Supplemental Airport proposed on 5,934 acres and having a 17,000-acre sphere of influence, would result in significant unmitigable cumulative land use impacts within the Ivanpah Valley due to the loss of the project site for shared uses other than power production.

Numerous solar and wind development applications have been filed in the southern California, Arizona, and Nevada Mojave Desert. The list of pending applications in Table 1 of the Cumulative Scenario is indicative of the interest in public lands for renewable energy generation at a regional level. Although it is not likely that all of the future solar and wind development projects proposed in the region would be constructed, it is reasonable to assume that some of them will. The regional loss of additional land base currently available for multiple use management to renewable energy projects is expected to be highly controversial and would result in significant unmitigable cumulative impacts to land use. (Ex. 300, pp. 6.5-18 – 6.2-21.)

4. Consistency with LORS

The California Desert Conservation Area (CDCA) was designated by Congress in 1976 through the Federal Land Policy and Management Act (FLPMA) and covers 25 million acres of land. The FLPMA provides that the public lands in the California desert be managed within the framework of a program of multiple uses, sustained yield, and the maintenance of environmental quality.

The ISEGS site includes areas in the CDCA that are designated Multiple Use Class L (Limited Use). MUC L protects sensitive, natural, scenic, ecological, and cultural resource values. Public lands designated MUC L are managed to provide lower-intensity, carefully controlled multiple use of resources while ensuring that sensitive values (cultural, scenic, biological resource) are not significantly diminished. The CDCA Plan identifies the following guidelines (permitted uses) for MUC L lands in relation to the proposed ISEGS project:

- Solar facilities may be allowed after NEPA requirements are met;
- Distribution Facilities - New distribution facilities may be allowed and will be placed underground where feasible except where this would have greater impacts than a surface facility and within existing rights-of-way where available;

The Energy Production and Utility Corridors Element of the CDCA Plan includes a network of planning corridors to meet the projected utility needs to the year 2000, identifies environmental constraints, siting procedures, and potential sites for geothermal development, wind energy parks, and power plants. Sixteen planning corridors were identified; the proposed project site is located near the junction of, and partially overlaps, two designated Utility Corridors (D and BB). The corridors are intended to include new electrical transmission lines of 161 kV or above, all pipelines with diameters greater than 12 inches, cables for interstate communications, and major aqueducts or canals for inter-basin transfers of water. The corridors vary in width from two to five miles.

Approximately 50 percent of the land area for Ivanpah 1, 2, and 3 and the administrative complex/logistics area are located within existing Utility Corridors D and BB. The land area for Ivanpah 3 would cover approximately 60 percent of the 2-mile width of Corridor D and 55 percent of Corridor BB.

Solar facilities may be allowed in the CDCA after NEPA requirements are satisfied. Construction of the project is contingent on BLM's approval of a right-

of-way grant to allow the proposed use on federally managed lands. Condition of Certification **LAND-1** memorializes that requirement.

The ISEGS project would be located within San Bernardino County's Desert Region of the General Plan. The Desert Planning Region includes a significant portion of the Mojave Desert and contains 93 percent of land in the county. The San Bernardino County General Plan identifies the community's land use, transportation, environmental, economic, and social goals and policies as they relate to land use and development, forms the basis for local government decision-making, provides residents with opportunities to participate in the planning and decision-making processes of their community, and informs residents, developers, decision-makers, and other cities and counties of the rules that guide development within the community.

San Bernardino County has adopted a one map approach for its general plan land use designations and zoning districts that allows the use of a single map showing both general plan land use designations and zoning classifications and assures consistency between both. These combined classifications are referred to as Land Use Zoning Designations in the General Plan and Land Use Zoning Districts in the County Development Code. The San Bernardino Development Code implements the San Bernardino General Plan by classifying and regulating the uses of land and structures within the unincorporated area, preserving and protecting the county's important agricultural, cultural, natural, open space and scenic resources, and protecting and promoting the public health, safety, and general welfare of residents and businesses in the county.

The ISEGS project, as a renewable energy facility, is consistent with the following Goals and Policies in the County General Plan:

> GOAL CO 8: The County will minimize energy consumption and promote safe energy extraction, uses and systems to benefit local regional and global environmental goals.
>
> CO 8.1: Maximize the beneficial effects and minimize the adverse effects associated with the siting of major energy facilities. The County will site energy facilities equitably in order to minimize net energy use and consumption of natural resources, and avoid inappropriately burdening certain communities. Energy planning should conserve energy and reduce peak load demands, reduce natural resource consumption, minimize

environmental impacts, and treat local communities fairly in providing energy efficiency programs and locating energy facilities.

CO 8.3: Assist in efforts to develop alternative energy technologies that have minimum adverse effect on the environment, and explore and promote newer opportunities for the use of alternative energy sources.

CO 9.2: The County will work with utilities and generators to maximize the benefits and minimize the impacts associated with siting major energy facilities. It will be the goal of the County to site generation facilities in proximity to end-users in order to minimize net energy use and natural resource consumption, and avoid inappropriately burdening certain communities.

Due to the visual impacts described in the Visual Resources section of this decision, ISEGS is not consistent with various visual resources policies in the General Plan which specify that visual features and vistas be identified and protected.[1] Those policies are not applicable, however, where they conflict with

[1] GOAL D/CO 1. Preserve the unique environmental features and natural resources of the Desert Region, including native wildlife, vegetation, water and scenic vistas.

D/CO 1.2 Require future land development practices to be compatible with the existing topography and scenic vistas, and protect the natural vegetation.

OS 5.1 Features meeting the following criteria will be considered for designation as scenic resources:

a. A roadway, vista point, or area that provides a vista of undisturbed natural areas.
b. Includes a unique or unusual feature that comprises an important or dominant portion of the viewshed (the area within the field of view of the observer).
c. Offers a distant vista that provides relief from less attractive views of nearby features (such as views of mountain backdrops from urban areas).

OS 5.2 Define the scenic corridor on either side of the designated route, measured from the outside edge of the right-of-way, trail, or path. Development along scenic corridors will be required to demonstrate through visual analysis that proposed improvements are compatible with the scenic qualities present.

OS 5.3 The County desires to retain the scenic character of visually important roadways throughout the County. A "scenic route" is a roadway that has scenic vistas and other scenic and aesthetic qualities that over time have been found to add beauty to the County. Therefore, the County designates the following routes as scenic highways and applies all applicable policies to development on these routes (see Figures 2-4A through 2-4C of the Circulation and Infrastructure Background Report):

c. Interstate 15 from the junction with Interstate 215 northeast to the Nevada state line, excepting those areas within the Barstow Planning Area and the community of Baker where there is commercial /industrial development; those portions within the Yermo area from Ghost

allowed uses on Federal lands. See Citizens for a Better Henderson v. Hodel (9th Cir. 1985) 768 F.2d 1051, 1055), cited by staff in its April 1, 2010, Opening Brief.

The Development Code provides standards and guidelines for the orderly growth and development of the county and its distinct communities, conserves and protects important agriculture, cultural, natural, open space and scenic resources, creates a comprehensive and stable pattern of land uses upon which to plan transportation, water supply, sewerage, energy, drainage/flood control and other public facilities and utilities, encourages appropriate uses of land to avoid undue concentration of population, and ensures compatibility between different types of development and land use. The Development Code identifies the ISEGS site as Resource Conservation (RC). Resource Conservation comprises the majority of the designated land uses in the county and covers over 1 million acres, or about 1,500 square miles of land. Most of the land within this designation is publicly owned (federal and state) and includes national parks, military bases, conservation areas, and lands owned by other federal and state agencies.

The RC land use zoning district allows open space, and recreational, commercial and industrial activities including the following: residential uses, agricultural activities, mining, resource protection, offices, cemeteries, kennels, public safety, single-family homes on very large parcels, broadcasting facilities, electric power generation, transportation facilities, wind energy facilities, wireless communication facilities, similar and temporary structures, and special events. All of these uses are either allowed or subject to permit approval from the county. Prohibited uses in this district include: indoor commercial entertainment, golf courses, schools, except for trade schools, sports or entertainment assemblies, homeless shelters, bed and breakfast inns, and solid waste disposal facilities. (Ex. 300, p. 6.5-13 – 6.5-18.)

6. Public Comment

No significant new environmental issues were raised in the comments.

Town Road to the East Yermo Road overcrossing on the south side only and from First Street to the East Yermo Road overcrossing on the north side; and all incorporated areas.

FINDINGS OF FACT

Based on the evidence, the Commission makes the following findings:

1. The ISEGS is not subject to a Williamson Act contract and will not result in conversion of farmland to non-agricultural uses.

2. The project will not physically divide or disrupt an established community.

3. The project will occupy approximately 3,600 acres of BLM managed public lands.

4. The ISEGS is consistent with applicable land use LORS, including the County General Plan and Development Code.

5. The ISEGS is compatible with surrounding land uses and will not result in any unmitigated public health or environmental impacts to sensitive receptors.

6. There is no evidence of any direct or indirect land use impacts resulting from development of the ISEGS.

7. Many other proposals to develop renewable energy projects, wind and solar, are pending in the Mojave Desert region. Combine with those projects, the ISEGS would remove a significant amount of land that would other wise be available for multiple uses.

CONCLUSIONS OF LAW

1. With implementation of the mitigation measures specified in this Decision, we conclude that construction and operation of the ISEGS Project will not result in significant direct or indirect land use impacts. It will, however, result in a significant cumulative land use impact because the proposed project, in combination with other similar projects, will remove a significant amount of land from the inventory of lands available for other users of the desert.

2. The Conditions of Certification, below, ensure that the project will be designed, constructed, and operated in conformance with the applicable land use laws, ordinances, regulations, and standards identified in the evidentiary record and listed in the pertinent portion of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

LAND-1 The project owner shall obtain a Right-of-Way Grant (ROW Grant) from the Bureau of Land Management (BLM). Among the conditions for obtaining the ROW grant, the applicant shall provide the following:

A. Prior to issuance of any right of way grant, the project owner shall submit a final Plan(s) of Development that describes in detail the construction, operation, maintenance, and termination of the right-of-way and its associated improvements and/or facilities. The project owner shall construct, operate, and maintain the facilities, improvements, and structures within this right-of-way in strict conformity with the final approved Plan of Development. The degree and scope of these plans will vary depending upon (1) the complexity of the right-of-way or its associated improvements and/or facilities, (2) the anticipated conflicts that require mitigation, and (3) additional technical information required by BLM's Authorized Officer and the CPM. The plans will be reviewed, and if appropriate, modified by the project owner until acceptable, and approved by BLM's Authorized Officer and the CPM. An approved Plan of Development shall be made a part of the right-of-way grant. Any relocation, additional construction, or use that is not in accord with the approved Plan(s) of Development, shall not be initiated without the prior written approval of BLM's Authorized Officer and the CPM.

B. A bond, acceptable to BLM's Authorized Officer, shall be furnished by the project owner prior to the issuance of a Notice to Proceed with construction or at such earlier date as may be specified by BLM's Authorized Officer. The amount of this bond shall be determined by BLM's Authorized Officer. This bond must be maintained in effect until removal of improvements and restoration of the right-of-way have been accepted by BLM's Authorized Officer and the CPM.

Verification: At least 30 days prior to the start of construction and prior to any Notice to Proceed with construction issued by BLM's Authorized Officer and the CPM, the project owner shall provide BLM's Authorized Officer and the CPM with documentation of the following:

A. BLM's ROW Grant and final approved Plan of Development;

B. The bond satisfactory to BLM's Authorized Officer; and

C. Certification that the project owner acknowledges that the ISEGS development and all related construction, operation, maintenance and closure activities are to be conducted in conformance with the approved Plan of

Development and within the approved ROW boundaries for the life of the project.

LAND-2 The project owner shall allow a setback between the (1) security and tortoise exclusion fence, and (2) the proposed ROW boundary. Once the fencing is constructed, all inspection, monitoring, and maintenance activities required outside of the fencing will occur on lands included within this setback area

Verification: At least 30 days prior to the start of construction, the project owner shall provide BLM's Authorized Officer and the CPM with a revised project description and construction plans specifying the inclusion of a setback area. The setback area shall be a minimum 20 feet wide within the ROW boundaries between the tortoise fence and the ROW boundary on the upslope boundary of the ROW, and a minimum 8-12 foot wide between the tortoise fence and ROW boundary on side and down slope boundaries. The project owner shall also provide BLM's Authorized Officer and the CPM with certification acknowledging that the ISEGS development and all related construction, operation, maintenance and closure activities are to be conducted within the ROW boundaries for the life of the project.

B. TRAFFIC AND TRANSPORTATION

This section addresses the extent to which the project will affect the local area's transportation network. The record contains an analysis of: (1) the roads and routings that are proposed to be used for construction and operation; (2) potential traffic-related problems associated with the use of those routes; (3) the anticipated encroachment upon public rights-of-way during the construction of the proposed project and associated facilities; (4) the frequency of trips and probable routes associated with the delivery of hazardous materials; and (5) the possible effect of project operations on local airport flight traffic.

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Project Site and Vicinity

The ISEGS consists of three separate solar energy power plants: Ivanpah 1, Ivanpah 2, and Ivanpah 3. The project is located in Southern California's Mojave Desert, approximately 3 miles southwest of the Nevada border, to the west of Ivanpah Dry Lake, on federal (public) land managed by the BLM. The Primm Valley Golf Club is immediately east of the proposed project area. Primm, Nevada is the nearest town, located just over the state line and approximately 4.5 miles east along Interstate 15 (I-15), which lies east of the project site, approximately 0.8 mile at its closest point. The project site is located approximately one mile west of the Yates Well Road interchange on I-15 in San Bernardino County, approximately 3.1 miles west of the California-Nevada border. Access to the site is via the Yates Well Road interchange on I-15 and Colosseum Road. The project site is vacant with the exception of a 115 kV electrical transmission line and the two-lane Colosseum Road. Approximately 4.5 miles and 15 miles northeast along I-15 are a retail/casino center with residential facilities and the town of Jean, respectively. The outskirts of greater Las Vegas lie approximately 32 miles to the north-northeast. Access to site is from the Yates Well Road Interchange on I-15 via Colosseum Road. (See **Project Description Figure 1**.) (Ex. 300, p.6.10-3 – 6.10-4.)

The critical roads and highways in the project vicinity are discussed below:

a. Interstate 15 (I-15)

I-15 is a north-south divided freeway linking Los Angeles, California, to Las Vegas, Nevada; it then through Nevada, Utah, Idaho, and Montana. The Ivanpah

1 plant lies closest to I-15; its boundary and power tower are approximately 1 mile and 1.5 miles northwest of I-15, respectively. Access from I-15 to the project site is provided via Yates Well Road. At this location I-15 consists of two lanes in each direction. Caltrans reports that I-15 carries approximately 59,690 daily vehicle trips near the ISEGS site.

b. Yates Well Road

Yates Well Road is a two-lane east-west local road providing direct access to I-15. The ramp terminal intersections at the I-15/Yates Well Road Interchange are stop-controlled. No other controlled intersections exist on Yates Well Road in the vicinity of the project. San Bernardino County reports that Yates Well Road carries approximately 249 daily vehicle trips between I-15 and Colosseum Road.

c. Colosseum Road

Colosseum Road, an east-west two-lane direct road, provides access to the site and the Primm Valley Golf Club. Colosseum Road is located both on and immediately to the east of the project site and connects to Yates Well Road. The County of San Bernardino does not have any traffic counts on record for Colosseum Road. (Ex. 300, p. 6.10-4.)

The existing Level of Service (LOS) of these roadways is shown in **TRAFFIC and TRANSPORTATION TABLES 1 and 2,** below.

Traffic and Transportation Table 1
Existing Intersection Level of Service

Intersection	AM Peak Hour	PM Peak Hour
Colosseum Road at Yates Well Road Westbound left/through approach	A	A
Colosseum Road at Yates Well Road Northbound left/right approach	A	A
I-15 southbound ramps at Yates Well Road Westbound left/through approach	A	A
I-15 southbound ramps at Yates Well Road Southbound left/through/right approach	A	A
I-15 northbound ramps at Yates Well Road Eastbound left/through approach	A	A
I-15 northbound ramps at Yates Well Road Northbound left/through/right approach	A	A

(Ex. 300, p. 6.10-5)

Traffic and Transportation Table 2
Average Daily Level of Service Summary for Existing Conditions

Name	Design Capacity	Volume[1]	V/C[2]	LOS[3]
Colosseum Road	3,000	NA	NA	A
Yates Well Road	6,000	249	0.04	A
I-15 NB & SB	72,000	59,690	0.83	C

1. Volume data for Colosseum Road a 2-lane dirt road is not maintained, however, based on field observation, this road is seldom used.
2. V/C = volume-to-capacity ratio.
(Ex. 300, p. 6.10-6)

Although I-15 operates at LOS C or better most days of the week (Monday through Thursday), northbound I-15 experiences increased traffic volumes on Friday afternoons because of commuter and tourist traffic from California to Las Vegas, Nevada. On most days, as presented in Traffic and Transportation Table 2, I-15 experiences an average daily traffic volume of approximately 60,000 trips—or an hourly average of approximately 1,200 trips. However, on Fridays from approximately noon to 10 p.m., northbound I-15 experiences an hourly average that ranges between approximately 1,700 and 2,000 trips and operates at LOS F. (Ex. 300, p. 6.10-6.)

An active Union Pacific Railroad line exists approximately five miles east of the project site. Project construction traffic is not expected to cross that rail line. No public transit service exists in the vicinity of the project site. Amtrak serves the corridor via bus only, with service between Las Vegas and Los Angeles. Many private bus companies operate on demand for Primm Valley Golf Club customers; but no established regular schedule exists. No bicycle facilities exist in the project area. (Ex. 300, p. 6.10-6.)

One existing public airport, Jean Airport, is located approximately 14 miles northeast of the project site and one mile south of Jean, Nevada. The Jean Airport has two paved runways that serve less than 50 aircraft, most of which are single engine airplanes and gliders. The Federal Aviation Administration (FAA) and the Bureau of Land Management (BLM) are currently reviewing a proposal to locate the Southern Nevada Supplemental Airport on approximately 6,000 acres of land just south of Jean. As currently planned, the proposed airport would provide sufficient capacity to accommodate future aircraft operations and aviation passenger demand in the Las Vegas Metropolitan Area. The ISEGS would be located approximately 40,000 feet (7.6 miles) southwest of the nearest runway at the proposed airport. (Ex. 300, pp. 6.10-6 – 6.10-7.)

2. Construction Traffic

Project construction is projected to take place over 48 months. Construction activities would generally occur from Monday through Saturday between the hours of 5 a.m. and 7 p.m. Additional hours may be necessary to compensate for schedule deficiencies or to complete critical construction activities. **Traffic and Transportation Table 3,** below, contains peak construction traffic estimates for the ISEGS. (Ex. 300, pp. 6.10-7 – 6.10-8.)

Traffic and Transportation Table 3
Daily and Peak Hour Estimated Construction Trip Generation

Trip Type	Average Daily Traffic	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Container trucks for heliostat fields	7	7	0	7	0	7	7
Delivery trucks for power block	2	2	0	2	0	2	2
Heavy vehicles for power block	3	3	0	3	0	3	3
Worker Busses	39	39	0	39	0	39	39
Private Vehicles	192	192	0	192	0	192	192
Total Construction Traffic	**243**	**243**	**0**	**243**	**0**	**243**	**243**

(Ex. 300, p. 6.10-8)

All intersections would continue to operate at an acceptable level of service (LOS C or better) in the morning and afternoon peak hours with the addition of peak construction traffic. Construction traffic would result in a change to the level of service at the intersection of the I-15 northbound ramps and Yates Well Road from LOS A to LOS B during the PM peak hour. This change would not be significant because LOS would remain above LOS C. (Ex. 300, p. 6.10-9.)

Northbound I-15 currently operates at LOS F on Friday afternoons. On the assumption that most construction workers would come from the Las Vegas metropolitan area, the originally proposed project was projected to add 227 vehicles during peak construction periods to northbound I-15 on Friday afternoons. Because northbound I-15 is already highly congested on Friday afternoons, and project-related construction traffic would exacerbate congestion in the area of Yates Well Road, project impacts on northbound I-15 on Fridays would be potentially significant. Mitigation, in the form of a traffic control plan required by Condition of Certification **TRANS-1**, would mitigate the project's direct impacts on Northbound I-15. (Ex. 300, p. 6.10-10.)

Prior to the evidentiary hearings, the Applicant entered into a project labor agreement which will have the effect of causing most of the project laborers to come from Southern California, not Las Vegas. While some of the workers would stay in Primm or Las Vegas during the week, they would be travelling on Southbound I-15 on Friday evenings, in the opposite direction as previously assumed. This would reduce, but not entirely eliminate the project's contribution to Northbound I-15 traffic on Friday afternoons. Direct impacts, with the traffic control plan required by Condition **TRANS-1**, would be insignificant.[1] (12/14/09 RT 113-117.)

Construction of the project's natural gas supply pipeline will temporarily affect access along Colosseum Road and a 1.6 mile portion of Colosseum Road will be rerouted to accommodate the project. Condition **TRANS-1** requires that an alternative route be provided during those periods when Colosseum Road is impassible. Construction of transmission line upgrades to serve the project will be in existing right of ways and is not expected to affect traffic. Similarly, a fiber optic telecommunications line to facilitate communications and control with the electric grid operators will be attached to existing poles and is not expected to affect traffic. (Ex. 300, p. 6.10-11 – 6.10-12.)

2. Operation Impacts and Mitigation

a. Traffic and Parking

The proposed project would require 90 employee commutes, or 180 daily trips, from 30 day shift and 60 night shift employees. They are presumed to live in the Las Vegas area.

Thirty operational day trips added to I-15 during peak hours would not represent a substantial increase in traffic volume and would not result in a significant impact Monday through Thursday. On northbound I-15, which operates at LOS F on Friday afternoons and into the late evening, the additional traffic is a potentially significant impact. Though minor compared with the existing traffic, the project related trips would exacerbate existing congestion on I-15 in the area of Yates Well Road. To limit the proposed project's contribution to existing congestion on northbound I-15 on Friday afternoons, we adopt Condition of Certification **TRANS-1**, which would require development and Energy

[1] See the cumulative impacts discussion, below, for a discussion of the project's cumulative contribution to Northbound I-15 traffic.

Commission staff approval of a traffic control plan that must include methods to substantially reduce the project's impact on traffic on I-15, such as staggering the departure of operational employees from the ISEGS site on Friday afternoons and/or establishing a carpool/vanpool incentive program. With that mitigation, the potentially significant impact would be reduced to a less than significant level.

Operational employees would park in a parking lot provided at Ivanpah 1. The on-site parking is expected to be large enough to accommodate at least 60 vehicles, therefore, operation of the ISEGS is not expected to result in an inadequate parking capacity. (Ex. 300, pp. 6.10-12 – 6.10-13.)

b. Glare

Glare is the difficulty in seeing in the presence of bright light such as direct or reflected sunlight or other light. Glare is caused by a substantial ratio of luminance (brightness) between a field of view and the glare source. Because the proposed project involves the use of mirrors to direct reflected sunlight at power tower receivers, the potential exists for glare to be observed by motorists on adjacent roadways and aircraft pilots. We address two different aspects of glare from sunlight:

1. the potential for light to result in damage to the retina, evaluated in units of kilowatts per square meter (kw/m2); and

2. luminance or brightness perceived by observers, evaluated in units of candelas per square meter (cd/m2).

No standards or regulations specific to light reflected from solar plants exist. Instead we look to principles and procedures developed by the Sandia National Laboratories for beam safety in the Solar 1 experimental plant at Daggett, California. There the following maximum permissible exposure (MPE) limits for reflected sunlight were identified:

- MPE for momentary exposure (for a period of 0.25 second or less) – 10 kw/m^2; and

- MPE for continuous exposure (for a period greater than 0.25 second) – 1 $kw/m^{2.}$

(Ex. 300, pp. 6.10-13 – 6.10-14.)

The highest intensity of solar radiation that could be directly reflected from a single heliostat is at its focal distance of 500 meters; the intensity diminishes with distance and is less than 1 kw/m^2. As 3.125 kw/m^2 is well below the 10 kw/m^2 MPE, there is no danger from momentary exposure at any distance from a mirror and a danger from continuous exposure only to those within 1,000 meters, beyond which the intensity is below that MPE. Given the varying angles of the sun and the ability of the mirrors to pivot in order to focus upon the power tower receivers, the continuous exposure danger zone extends to those on the ground and those flying above the mirrors. (Ex. 300, p. 6/10-14.)
The mirrors will tend to be focused on the power tower receivers but could, during various circumstances such as a mid day periods when some mirrors must be focused away to avoid overheating the receiver, malfunctioning mirror aiming controls, or maintenance, be randomly focused away from the receivers. In those cases, the danger would be only to those within 1,000 meters of the mirror. Hikers in the Clark Mountains, motorists on I-15, and aviators flying more than 1,000 meters above the project, would not be in danger which could be addressed by simply looking away. Aircraft would be permitted to fly as low as 411 meters (1,350 feet) above the site and thus could be exposed to intensities exceeding the continuous exposure MPE. We adopt Condition of Certification **TRANS-3** requiring preparation of a Heliostat Positioning Plan to address the potential for exposure to levels above the MPEs. (Ex. 300, pp. 6.10-14 – 6.10-16.)

The power tower receiver surfaces, approximately 20 meters high and 120 meters above the ground surface would reflect solar radiation as high as 687.5 kw/m^2 at 1 meter, vastly exceeding the MPEs. At distances where exposure is possible, the intensities would be significantly below the MPEs—0.048 kw/m^2 at 120 meters (394 feet) for those on the ground and 0.009 kw/m^2 for those flying at the minimum 1,350 feet above ground, or approximately 900 feet (274 meters) above the receivers. (Ex. 300, p. 6.10-17.)

Though not dangerous to retinal health, the power tower receivers will glow quite brightly when in operation. Traffic and Transportation Table 4 compares the luminance of common objects.

Traffic and Transportation Table 4
Luminance of Common Objects

Object	Luminance (cd/m^2)
Sun	1.6 billion
100-watt lamp	47,000
Compact fluorescent lamp	30,000

Candle flame	10,000
Daylight sky	8,000
Moonlight	2,500

(Ex. 300, p. 6.10-18)

The highest intensity of luminance expected to be reflected from a single heliostat, at its surface, would be 1.34 billion cd/m^2. In the event of heliostat repositioning or malfunction that resulted in sunlight being directed away from the power tower receiver and into the sky, the luminance of light reflected from a single heliostat as seen by an aircraft flying over the site at a distance of at least 370 meters would be as high as 35 million cd/m^2, or approximately 2 percent of the brightness of the sun. This level of brightness would be extremely bright and would be temporarily blinding when viewed directly. Condition **TRANS-3** requiring a Heliostat Positioning Plan, will mitigate any potential heliostat luminance impacts to receptors who do not immediately avert their eyes. (Ex. 300, p. 6.10-17 – 6.10-19.)

Brightness of light reflected at the surface of each power tower receiver would be approximately 555,000 cd/m^2, decreasing in intensity with increased distance as shown in **Traffic and Transportation Table 5**, below. To provide a frame of reference, the intensity of light produced by a 100-watt light bulb is included. This comparison was disputed during the hearings; Staff testified that the much larger receiver panels do not equate to a single 100-watt bulb but rather to the number of bulbs necessary to cover the receiver's surface.

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Traffic and Transportation Table 5
Brightness of Light Reflected from ISEGS Power Tower Receivers

Distance		Luminance (cd/m^2)	
Meters	**Feet**	**Receivers**	**100-watt Bulb**
1	3.3	555,000	47,000
5	16.4	22,200	1,880
10	32.8	5,550	470
35	115	453	38.4
50	164	222	18.8
100	328	55.5	4.70
120	394	38.54	3.26
140	459	28.32	2.40
150	492	24.67	2.09
200	656	13.88	1.18
250	820	8.88	0.75
274	899	7.39	0.63
500	1,640	2.22	0.19
1,000	3,281	0.56	0.047
1,448	4,751	0.26	0.02

(Ex. 300, p. 6.10-19)

While neither blinding nor damaging to retinas, the reflected light from the power tower receivers will be noticeable and unlike any other light source in the vicinity. They could distract drivers, especially on I-15 where the option of stopping to investigate this novel light source is not available. Out of concern for safety for the motoring public, Staff proposed, and we adopt, Condition of Certification **TRANS-4** to assure that the receivers' luminance is not a safety hazard to motorists.[2] (Ex. 300, pp. 6.10-19 –6.10-21; 12-14-09 TR p. 99 – 100.)

c. Obstructions to Air Navigation

Objects greater than 200 feet tall constructed within three miles of an airport with a runway of more than 3,200 feet in length may present an obstruction hazard to aircraft, as may objects penetrating the horizontal departure surface from a distance of 10,000 feet at a slope of 50 to 1 with an additional 40,000 feet at a slope of 40 to 1. The ISEGS would require construction of three power towers to a height of 469 feet.

No existing airports are located within three miles of the proposed project site. However, one runway of the proposed Southern Nevada Supplemental Airport is proposed to be located approximately 40,000 feet northeast of the ISEGS site.

[2] Glare impacts on the scenic vistas in the project's vicinity are discussed in the Visual Resources section of this Decision.

The FAA reviewed the seven originally proposed power towers and found no hazards to air navigation, recommending that each tower be marked with appropriate lighting, which we require via Condition **TRANS-5**.

Power Tower 1 is within the flight path of Instrument Route 213 (IR-213), a U.S. Navy training flight route. The Navy has confirmed that Power Tower 1 would not significantly affect IR-213, and does not object to its construction. (Ex. 300, pp. 6.10-21 –6.10-22.)

d. Thermal Plumes

When the ISEGS is operating, heat exhaust from the air cooled condensers (ACCs) would have the potential to cause turbulence to low flying aircraft. The intensity of turbulence produced by an ACC is a function of wind speed, solar radiation, and ambient temperature and would therefore vary depending on these conditions. Turbulence intensity would peak during calm or low wind conditions and would not occur at night when the ACC is not in operation.

Aircraft could be subject to disruption (i.e. turbulence) from a thermal plume with an average plume velocity of 4.3 m/s or higher. The worst-case ACC operating conditions for the three ACCs, are derived from heat balance data and other operating variables (exhaust velocity/temperature increase). The peak height for thermal plume average velocities of 4.3 m/s for the originally proposed 200 MW generating area ACC at Ivanpah 3 is approximately 1,350 feet and 900 feet, for the lower capacity Ivanpah 1 and 2 ACCs. (The height was not recalculated following the project modification reducing Ivanpah 3's output from 200 MW to 125 MW and increasing the outputs of Ivanpah 1 and 2 to 120 MW and 125 MW. It would likely be somewhat lower for Ivanpah 3 and somewhat higher, but not higher than 1,350 feet for Ivanpah 1 and 2.) (Ex. 300, p. 6.10-22.)

To ensure that thermal plumes associated with ISEGS operation do not impact aviation activities within the navigable airspace above the site, we adopt Condition of Certification TRANS-6, requiring notification to pilots of the potential for turbulence and to avoid direct overflight of the ISEGS site below 1,350 feet during daylight hours.

e. Emergency Access

Emergency services vehicle access to the site is sufficient. (Ex. 300, p. 6.10-23.)

f. Hazardous Material Transportation

Staff examined the quantities and types of hazardous materials used in the construction and operation of ISEGS and has not recommended that a specific route for the transportation of those materials to the site be required. We concur. Compliance with applicable LORS regarding the transport of hazardous materials will adequately protect the public and the environment. (Ex. 300, p. 6.10-23.)

3. Cumulative Impacts

Of the present and foreseeable future projects are identified for cumulative impacts analysis, only one project—First Solar—potentially affects the local roads affected by ISEGS. The unused capacity of Yates Well Road and Colosseum Road would easily accommodate the construction traffic for that second facility. (Ex. 300, pp. 6.10-26 – 6.10-27.)

Looking regionally, projects that will potentially be under construction at the same time as the ISEGS, are the Southern Nevada Supplemental Airport, the Desert Xpress Train, the I-15 Mountain Pass Truck Lane, the First Solar photovoltaic project, and the Caltrans Joint Port of Entry. Construction of each of these projects would result in increased vehicle trips on I-15. It is highly likely that some, if not all of these projects would result in additional vehicle trips on northbound I-15 on Friday afternoons. As we discuss above, I-15 currently operates at a congested level of service (LOS F) on Friday afternoons due to the high volume of commuter and tourist traffic traveling from California to Las Vegas. The portion of ISEGS construction traffic that will travel on northbound I-15 is a significant direct impact by virtue of its increasing of the burden on the overburdened highway. In combination with the above cumulative projects, ISEGS will place an even greater burden on the overcrowded highway. It therefore has a cumulatively significant effect. (Ex. 300, pp. 6.10-27 – 6.10-28.)

4. Compliance with LORS

The applicable Laws, Ordinances, Regulations and Standards are summarized in Appendix A-1. Staff's testimony that the project will comply with those LORS (Ex. 300, p. 6.10-29 – 6.10-30) was not disputed.

FINDINGS OF FACT

Based on the evidence, we make the following findings:

1. All roads in the project vicinity, except highway I-15 on Friday afternoons, operate at acceptable levels of service and will continue to do so after the addition of ISEGS construction and operations traffic.

2. I-15 operates at LOS F during Friday afternoons due to existing traffic. Construction and operations traffic will add additional trips to an overloaded roadway and contribute additional congestion, and is a significant cumulative impact. Direct impacts on northbound I-15 are mitigated to insignificant levels by the requirement of a traffic control plan.

3. Adequate parking for operational workers will be provided on site.

4. The project's projected levels of glare are below the maximum permissible exposure limit for momentary or continuous exposure at locations where the public may encounter glare emissions. A required heliostat position plan and periodic measurement of glare will reduce any potential impacts, including safety hazards to motorists due to visual distraction to insignificant levels.

5. Thermal plumes from the air cooled condensers could potentially upset aircraft which overfly the plumes at low altitude. To mitigate this potential impact, a notification program to alert pilots of the potential has been required.

6. The ISEGS will comply with all applicable LORS related to traffic and transportation

CONCLUSIONS OF LAW

1. The ISEGS is consistent with all applicable laws, ordinances, regulations, and standards.

2. The project will have a significant cumulative impact on the local and regional road/highway network due to the vehicle trips it will add to northbound I-15 on Friday afternoons, an already impacted highway operating at LOS F during that time.

CONDITIONS OF CERTIFICATION

TRAFFIC CONTROL PLAN

TRANS-1 Prior to start of construction of the ISEGS, the project owner shall prepare and implement a Traffic Control Plan (TCP) for ISEGS

construction and operation traffic. The TCP shall address the movement of workers, vehicles, and materials, including arrival and departure schedules, and designated workforce and delivery routes.

The project owner shall consult with the County of San Bernardino and the Caltrans District 8 office in the preparation and implementation of the Traffic Control Plan and shall submit the proposed Traffic Control Plan to the County of San Bernardino and the Caltrans District 8 office in sufficient time for review and comment and to BLM's Authorized Officer and the Energy Commission Compliance Project Manager (CPM) for review and approval prior to the proposed start of construction and implementation of the plan. BLM's Authorized Officer and the CPM shall review and approve the TCP or identify any material deficiencies within thirty (30) days of receipt. The project owner shall provide a copy of any written comments from the County of San Bernardino and the Caltrans District 8 office and any changes to the Traffic Control Plan to BLM's Authorized Officer and the CPM prior to the proposed start of construction.

Verification: At least 90 calendar days prior to the start of construction, including any grading or site remediation on the power plant site or its associated easements, the project owner shall submit the proposed traffic control plan to the County of San Bernardino and the Caltrans District 8 office for review and comment and to BLM's Authorized Officer and the CPM for review and approval. The project owner shall also provide BLM's Authorized Officer and the CPM with a copy of the transmittal letter to the County of San Bernardino and the Caltrans District 8 office requesting review and comment.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from either the County of San Bernardino and the Caltrans District 8 office, along with any changes to the proposed traffic control plan to BLM's Authorized Officer and the CPM for review and approval.

The Traffic Control Plan shall include:

- providing an incentive program to encourage construction workers to use van or bus service;
- limiting truck deliveries to the project site on Fridays to mornings only so they occur before 12:00 noon;
- redirection of construction traffic with a flag person as necessary to ensure traffic safety and minimize interruptions to non-construction related traffic flow;
- signage, lighting, and traffic control device placement at the project construction site and laydown areas;

- signage along eastbound and westbound Yates Well Road and at the entrance of each of the I-15 northbound and southbound off-ramps at Yates Well Road notifying drivers of construction traffic throughout the duration of the construction period;
- signage and detours to redirect traffic from Colosseum Road during construction activities related to roadway realignment and pipeline installation in and across the Colosseum Road right of way;
- a Heavy Haul Plan addressing the transport and delivery of heavy and oversized loads requiring permits from Caltrans or other state and federal agencies;
- a work schedule and end-of-shift departure plan will be implemented to limit Friday departures from the site, traveling north to Las Vegas, to 12 or fewer vehicles every three minutes between 12:00 noon and 10:00 PM.

REPAIR OF PUBLIC RIGHT-OF-WAY

TRANS-2 The project owner shall restore all public roads, easements, and rights-of-way that have been damaged due to project-related construction activities to original or near-original condition in a timely manner, as directed by the BLM's Authorized Officer and CPM. The project owner's use of Yates Well Road shall not diminish the rights or use of the road by other BLM authorized users. Repairs and restoration of access roads may be required at any time during the construction phase of the project to assure safe ingress and egress.

Prior to the start of site mobilization, the project owner shall consult with the County of San Bernardino and Caltrans District 8 and notify them of the proposed schedule for project construction. The purpose of this notification is to request that the County of San Bernardino and Caltrans consider postponement of public right-of-way repair or improvement activities in areas affected by project construction until construction is completed and to coordinate with the project owner regarding any concurrent construction-related activities that are planned or in progress and cannot be postponed.

Verification: At least 30 days prior to the start of mobilization, the project owner shall photograph or videotape all affected public roads, easements, and right-of-way segment(s) and/or intersections and shall provide BLM's Authorized Officer, the CPM, the affected local jurisdiction(s) and Caltrans (if applicable) with a copy of these images. The project owner shall rebuild, repair and maintain all public roads, easements, rights-of-way in a usable condition throughout the construction phase of the project.

Prior to the start of site mobilization, the project owner shall consult with the County of San Bernardino and Caltrans District 8 and notify them of the proposed schedule for project construction. The purpose of this notification is to request that the County of San Bernardino and Caltrans consider postponement of public right-of-way repair or improvement activities in areas affected by project construction until construction is completed and to coordinate with the project owner regarding any concurrent construction-related activities that are planned or in progress and cannot be postponed.

Within 60 calendar days after completion of construction, the project owner shall meet with BLM's Authorized Officer and the CPM, the County of San Bernardino and Caltrans District 8 to identify sections of public right-of-way to be repaired. At that time, the project owner shall establish a schedule to complete the repairs and to receive approval for the action(s). Following completion of any public right-of-way repairs, the project owner shall provide a letter signed by the County of San Bernardino and Caltrans District 8 stating their satisfaction with the repairs to BLM's Authorized Officer and the CPM.

HELIOSTAT POSITIONING PLAN AND MONITORING

TRANS-3 The project owner shall prepare a Heliostat Positioning Plan that would avoid potential for human health and safety hazards from solar radiation exposure.

Verification: Within 90 days before commercial operation of any of the three ISEGS power plants, the project owner shall submit the Heliostat Positioning Plan to BLM's Authorized Officer and the CPM for review and approval. The project owner shall also submit the plan to CalTrans, FAA, and the Clark County Department of Aviation for review and comment and forward any comments received to BLM's Authorized Officer and the CPM. The Heliostat Positioning Plan shall accomplish the following:

1. Identify the heliostat movements and positions (including reasonably possible malfunctions) that could result in potential exposure of observers at various locations including in aircraft, motorists, pedestrians and hikers in the Clark Mountains to reflected solar radiation from heliostats;

2. Describe within the HPP how programmed heliostat operation would avoid potential for human health and safety hazards at locations of observers as attributable to momentary solar radiation exposure greater than the Maximum Permissible Exposure of 10 kw/m^2 (for a period of 0.25 second or less)

3. Prepare a monitoring plan that would: a) obtain field measurements in response to legitimate complaints; b) verify that the Heliostat Positioning Plan would avoid potential for human health and safety

hazards including temporary or permanent blindness at locations of observers; and c) provide requirements and procedures to document, investigate and resolve legitimate complaints regarding glare.

4. The monitoring plan should be coordinated with the FAA, U.S. Department of the Navy, CalTrans, CHP, and Clark County Department of Aviation in relation to the proposed Southern Nevada Supplemental Airport and be updated on an annual basis for the first 5 years, and at 2-year intervals thereafter for the life of the project.

Verification: Within 90 days before commercial operation of any of the three ISEGS power plants, the project owner shall submit the Heliostat Positioning Plan to BLM's Authorized Officer and the CPM for review and approval. The project owner shall also submit the plan to CalTrans, FAA, and the Clark County Department of Aviation for review and comment and forward any comments received to BLM's Authorized Officer and the CPM.

VERIFICATION OF POWER TOWER RECEIVER LUMINANCE AND MONITORING

TRANS-4 The project owner shall prepare a Power Tower Luminance Monitoring Plan to provide procedures to conduct periodic monitoring and to document, investigate and resolve complaints regarding distraction effects to aviation, vehicular and pedestrian traffic associated with the power towers.

Verification: Within 60 days prior to commercial operation of the first ISEGS power plant to become operational, the project owner shall provide a Power Tower Luminance Monitoring Plan applicable for the ISEGS Project for review and approval by BLM's Authorized Officer and the CPM. The plan shall specify procedures to document, investigate and resolve complaints regarding glare, and report these to BLM's Authorized Officer and the CPM within 10 days of receiving a complaint.
The project owner shall evaluate the effects of the intensity of the luminance of light reflected from the power tower receivers for the following scenarios:

A. Within 90 days following commercial operation;
B. After the initial 5 years of operation;
C. If a major design change is implemented that results in an increase of the reflective luminance of the power tower for each of the three ISEGS power plants (Ivanpah 1, 2 and 3); and
D. After receiving a legitimate complaint regarding a distraction associated with the power towers.

The Power Tower Luminance Monitoring Plan shall include provisions for the following:

1. Coordination of luminance evaluations with the FAA, U.S. Department of the Navy, CalTrans, CHP, and with Clark County Department of Aviation in relation to the proposed Southern Nevada Supplemental Airport;

2. Reporting within 30 days after completing luminance measurements required under this plan; the project owner shall submit a summary report to FAA, U.S. Department of the Navy, CalTrans, CHP and Clark County Department of Aviation for review and comment, and to BLM's Authorized Officer and the CPM for review and approval.

3. Measurement of luminance at the locations where any distraction effects have been reported and at the locations nearest the power towers from the four sides of the power plant boundaries, and the nearest public roads, which may be substituted for one of the sides of the power tower of each of the three power plants during the time of day when values would be highest;

4. Measurement of luminance using an illuminance meter, photometer, or similar device and reporting of data in photometric units; the measurements are intended to provide a relative and quantifiable measure of luminance that can be associated with any observed and reported distraction effect from the power tower receivers that may support anticipation and investigation of any future effects.

5. Provisions for identifying and implementing appropriate mitigation measures if reported distraction is determined to be legitimate and if power tower luminance is determined to be causing a safety concern; The project owner shall consider and propose any reasonable mitigation measures that are technically and financially feasible. The mitigation measures may include surface treatment or material changes to increase absorption and reduce reflectivity of the power tower receivers, road signage, screening or other reasonable measures.

6. Post-mitigation verification; Within 30 days following the implementation of mitigation measures designed to reduce reflectivity of the power towers, the project owner shall repeat the luminance measurements to demonstrate the effectiveness of mitigation measures and prepare a supplemental survey report for review and comment by FAA, U.S. Department of the Navy, CalTrans, CHP and Clark County Department of Aviation, and for review and approval by BLM's Authorized Officer and the CPM.

FAA NOTIFICATION

TRANS-6 Prior to start-up and testing activities of the plant and all related facilities, the project owner shall coordinate with the FAA to notify all pilots using the airspace in the vicinity of the ISEGS of potential air hazards from turbulence.

Verification: At least 60 days prior to start of project operation, the project owner shall submit to BLM's Authorized Officer and the CPM for review a letter from the FAA showing compliance with these measures. These notification activities would include, but not be limited to: 1) issuing a notice to airmen (NOTAM) of the identified air hazard, 2) updating all applicable FAA-approved airspace charts to indicate that plume hazards could exist up to an altitude of 1,350 feet above the ground surface, and 3) requesting FAA to require pilots to avoid direct overflight of the ISEGS site at or below this altitude during daylight hours.

C. SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

This topic reviews the demographic characteristics of population centers near the project site to evaluate the potential impacts of project-induced population increases and the fiscal and physical capacities of local communities to accommodate population increases. The project's economic benefits, including local project-related expenditures, property and sales tax revenues, as well as school impact fees, are also discussed. Additionally, an environmental justice screening analysis is included to determine whether the project will result in disproportionate impacts on minority and/or low-income populations and, if so, whether mitigation is required.

The evidence for this topic was uncontested. (Exs. 1, § 5.10, App. 5.10A, 5.10B; 2, § 5.10; 32, p. 8; 57, p. 27; 65; 300, p. 6.8-2 et seq.; 12/14/09 RT 113-119, 305.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

Under both NEPA and CEQA Guidelines, a project may have a significant effect on socioeconomics if it would:

- Induce substantial population growth in an area, either directly or indirectly;
- Displace substantial numbers of people and/or existing housing, necessitating the construction of replacement housing elsewhere;
- Cause a substantial change in revenue for local businesses or government agencies; or
- Adversely impact acceptable levels of service for law enforcement, schools, and hospitals. (Ex. 300, p. 6.8-11.)

Construction of ISEGS will occur in three phases over a four-year period. (Ex. 1, § 5.10.4.3.) The data for all three phases were combined to evaluate the worst-case impacts resulting from the in-migration of ISEGS workers to the study area, specifically, communities in San Bernardino County, California, and Clark County, Nevada.[1] (Exs. 300, pp. 6.8-4, 6.8-12; 1, § 5.10.3.1.)

[1] The nearest population centers in Clark County include Primm, Nevada, at 4.5 miles northeast of the project site, Las Vegas, and Henderson, Nevada, each about 50 miles northeast of the site, The nearest population center in San Bernardino County is Baker, California, about 45 miles southwest of the site. (Ex. 300, p. 6.8-4.)

1. Potential Impacts

Socioeconomic impacts are considered significant if a large influx of non-resident workers and dependents move to the project area, increasing demand for community resources that are not readily available. (Exs. 300, p. 6.8-11; 1, § 5.10.4.1.)

Over the four-year construction period, an average of approximately 474 daily construction workers, with a peak daily workforce of 959, will be required depending on the month and phase of development. Laborers will include craftspeople, supervisory, support, and construction management personnel. (Exs. 300, p. 6.8-12; 1, § 5.10.4.3.1, **Tables 5.10-13, 5.10-14, 5.10-15**; 65.)

The record indicates that a large local workforce in San Bernardino and Clark Counties is sufficiently skilled and diverse to meet project construction needs. (Exs. 300, p. 6.8-7, **Soc. & EJ Table 3**; 1, § 5.10.4.3.1, **Tables 5.10-17, 5.10-18**.)

Subsequent to submission of both Applicant's and Staff's analysis of the workforce, the Applicant executed a Project Labor Agreement with 50 Southern California labor unions to provide the majority of project construction workers from the Inland Empire areas of San Bernardino and Riverside Counties. The previous analysis assumed that most of the workers would commute from the Las Vegas area. (12/14/09 RT 114:15-25, 115:1-18.)

According to Staff, construction workers tend to commute daily from their homes within a two-hour commuting distance. The project's peak requirement of 959 construction workers represents less than one percent of the total available construction workforce within the study area. Assuming that the majority of workers will commute two hours from the Inland Empire to the site, it is expected that no population in-migration will occur as a result of project-related construction activities. Therefore, the project will not result in significant impacts to existing population levels or employment distribution within the study area. (Exs. 1, § 5.10.4.3.2; 300, p. 6.8-12.)

During the four-year construction period, it is likely that construction workers from the Inland Empire will temporarily relocate to the project area and stay in local hotels, motels, or other rental properties during the workweek but return to their homes on weekends. The evidence indicates there is an adequate supply of hotels/motels and rental properties in nearby Primm and other communities

within the project vicinity to accommodate weekly commuters and/or temporary residents. (Exs. 1, § 5.10.4.3.3; 300, pp. 6.8-8, 6.8-9, **Soc. & EJ Table 4**.)

Applicant expects to hire about 90 permanent, full-time employees from the local area for project operation. According to Staff, operational workers will typically commute up to one hour rather than relocate. The one-hour commute range is within the study area and includes communities in San Bernardino and Clark Counties. A minimal number of employees may relocate closer to the site and require permanent housing; however, there is an abundance of housing units available within commuting distance so any resulting effects on housing or public services are considered *de minimis*. (Exs. 1, § 5.10.4.4.3; 65; 300, p. 6.8-13.)

We therefore find that impacts on housing and related services will be negligible in relation to the supply of available housing and services available. No replacement of existing residential housing will be necessary because project construction and operation will not increase demand for housing. (Exs. 300, p. 6.8-13; 1, § 5.10.4.4.3.)

Since project-induced population increases will be minimal, construction and operation of the project will not result in significant adverse impacts on schools, parks and recreation, public utilities, law enforcement, or emergency services in the local communities. (Exs. 1, § 5.10.4.3.2 et seq., § 5.10.4.4.7 et seq.; 300, pp. 6.8-15, 6.8-16.) See further discussion in the **Worker Safety and Fire Protection** section of this Decision.

Section 17620 of the California Education Code allows school districts to levy school development fees for new commercial or industrial construction within their boundaries. (See also Govt. Code, §§ 65996-65997.)

The ISEGS site is located within the Baker Valley Unified School District (BVUSD). The local school development fee for the BVUSD is calculated at $0.33 per square footage of the covered and enclosed space of commercial or industrial projects. (Ed. Code, § 17620 (a)(1)(A).) Based on the total area (9,682 square feet) of the project's administration/storage building, the ISEGS must pay a one-time school impact fee of $3,195 to the BVUSD.[2] (Ex. 300, p. 6.8-10.) We have adopted Condition of Certification **SOCIO-1** to ensure that the project owner

[2] The administrative building is the only enclosed structure at the project site. (Ex. 300, p. 6.8-10.)

pays the school impact fee in compliance with applicable LORS.[3]

2. Section 25523(h) Public Benefit Findings

Public Resources Code section 25523(h) requires discussion of the project's public benefits. The project's fiscal benefits, based on property value, payroll, local purchases of equipment, supplies, and associated expenses, include the following estimates (all estimates are in 2007 dollars):

- Under existing state law, the ISEGS will generate property tax revenues of approximately $2.2 million per year, which would be allocated proportionately to school districts, special districts, libraries, and other public agencies in San Bernardino County. (Exs. 300, p. 6.8-14; 32.)
- The total capital costs of the ISEGS are estimated at $300 million for Phase I, $280 million for Phase II, and $520 million for Phase III. Construction payrolls are estimated at $57.7 million for Phase I, $57.1million for Phase II, and $82.3 million for Phase III. The anticipated construction payrolls, the local purchases of materials and supplies, and the sales tax revenues generated by the expenditures will have a temporary beneficial impact on the economies of San Bernardino and Clark Counties. (Ex. 1, § 5.10.4.3.4 et seq.)
- When all three phases of ISEGS are completed, the project will provide an annual operations payroll of approximately $5.4 million. The annual operations and maintenance budget is estimated at $340,500. The payroll, local purchases, and sales tax revenues generated by the expenditures will have beneficial effects on the economies of San Bernardino and Clark Counties. (Ex. 2; Ex. 57, p. 27; Ex. 300, p. 6.8-14.)

The project will also create indirect and induced short-term employment in the study area. Applicant used an Impact Analysis for Planning (IMPLAN) input-output model of the study area to estimate the project's multiplier effects associated with construction and operation. The IMPLAN results show that purchases by construction workers and permanent employees as well as project expenditures for materials and supplies will generate quantifiable secondary economic benefits that are likely to occur if the project is developed. (Ex. 1, § 5.10.4.3.4 et seq., § 5.10.4.4.4 et seq.)

[3] Although the Final Staff Assessment did not recommend a Condition of Certification requiring proof of payment, the Commission has consistently adopted such a Condition to monitor compliance with the school impact fee requirement and we find it appropriate in this case.

Staff's **Socioeconomics and Environmental Justice Table 7**, replicated below, summarizes the project's anticipated economic benefits. As a result of the updated, smaller footprint for ISEGS Phase III, the number of employees and the potential economic benefits would be reduced proportionately; however, since there are no project-related population growth socioeconomic impacts, the smaller footprint would not change that finding. (Ex. ___.)

Socioeconomics and Environmental Justice Table 7
Noteworthy Public Benefits
Related to Ivanpah Solar Electric Generating System

Fiscal Benefits	
Estimated annual property taxes	$2.2 million per year
State and local sales taxes: Construction	$6.0 million
State and local sales taxes: Operation	$2,090 per year
School Impact Fee	$3,195
Non-Fiscal Benefits	
Total capital costs	$1,100 million
Construction payroll	$197 million
Operations payroll	$5.4 million
Construction materials and supplies	$77 million
Operations and maintenance supplies	$4.0 million per year
Direct, Indirect, and Induced Benefits	
Estimated Direct Employment	
Construction	An average of 474 jobs per month
Operation	90 full-time jobs
Estimated Secondary Employment	
Construction	528 jobs
Operation	12 jobs
Estimated Secondary Income	
Construction	$20.5 million
Operation	$470,150

Source: Ex. 300, p. 6.8-20.

3. Environmental Justice Screening Analysis

California law defines environmental justice as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." (Govt. Code § 65040.12(e); Pub. Res. Code, § 71116(j).)

Federal Executive Order 12898 (1994), "*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*," requires state and federal agencies to incorporate environmental justice

concerns in their environmental analyses. The USEPA's *Draft Revised Guidance for Investigating Title VI Administrative Complaints Challenging Permits* (USEPA, Aug. 2000) calls for a two-step analysis: (1) does the potentially affected community include minority and/or low-income populations and, if it does, (2) are the environmental impacts likely to fall disproportionately on minority and/or low-income members of the community. (Ex. 1, App. 5.10B.) See also, *Title VI Public Involvement Guidance for EPA Assistance Recipients Administering Environmental Permitting Programs*, 71 Fed. Reg. 14207 et seq. (USEPA, Mar. 21, 2006).

According to the USEPA's *Guidance*, an environmental justice population exists if the minority and/or low-income populations of the affected area constitute 50 percent or more of the general population or if the minority population percentage in the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. (Ex. 1, App. 5.10B.)

Applicant used a six-mile radius of the project site to determine the presence of environmental justice populations. The same six-mile radius was used to assess air quality and public health effects. Census 2000 data indicate that the densities of minority and low-income populations, respectively, within the six-mile radius do not exceed the 50 percent threshold level that would require an environmental justice screening analysis. (Exs. 1, App. 5.10B; 300, p. 6.8-5 et seq.)

According to Applicant, since the mitigated project will not result in high and adverse impacts to any population, the project will not result in any disproportionate impacts to environmental justice populations.[4] Staff's analysis reflects the same conclusion. (Exs. 1, App. 5.10B; 300, pp. 6.8-6, 6.8-7.)

[4] The evidentiary record indicates that the fully mitigated project will not result in any significant adverse environmental or public health impacts to any population, regarding the following technical topics: **Air Quality, Hazardous Materials Management, Land Use, Noise, Public Health, Socioeconomics, Soils and Water Resources, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, and Waste Management**. The analyses for each topic were based on well-established scientific protocols and regulatory standards, which account for sensitive receptors that are presumed to be most susceptible to adverse environmental or public health impacts.

4. Cumulative Impacts

Cumulative socioeconomics impacts may occur when overlapping construction schedules for several projects in the same vicinity create a demand for workers that cannot be met by the local labor force, resulting in an influx of non-local workers and their dependents. (Ex. 300, pp. 6.8-16 to 6.8-17.)

There are prospective plans for substantial solar and wind energy development in the Ivanpah Valley area and throughout the Southern California desert region. However, despite the potential for construction schedule overlaps, there is no evidence that the project's demand for workers will result in adverse cumulative socioeconomic effects because a large, skilled workforce in the study area is available within commuting distance. Since the ISEGS will not result in any project-specific adverse socioeconomic impacts, it will not cumulatively contribute or combine with any potential impacts related to the future solar and wind development projects in the region. Further, the economic benefits derived from construction and operation of ISEGS will provide cumulative benefits when project-induced revenues are combined with the revenues from future development projects. We therefore conclude that ISEGS will not contribute to adverse cumulative impacts to the area's population, employment, housing, police, schools, parks, or hospitals. (Ex. 300, pp. 6.8-17 to 6.8-18.)

5. Closure

It is assumed that the number and type of workers required for closure and decommissioning activities would be similar to the construction phase and would result in no significant project-induced population growth or impact on public services. It is also assumed that similar temporary economic benefits would accrue to communities in the study area. (Ex. 300, pp. 6.8-13, 6.8-16.)

FINDINGS OF FACT

Based on the uncontroverted evidence of record, we make the following findings:

1. A large, skilled labor pool in San Bernardino County, California, and in neighboring Clark County, Nevada, is available for construction and operation of the project.

2. The ISEGS project owner has executed a Project Labor Agreement with 50 Southern California labor unions to provide the majority of project

construction workers from the Inland Empire areas of San Bernardino and Riverside Counties.

3. Over the four-year construction period, an average of approximately 474 daily construction workers, with a peak daily workforce of 959, will be required depending on the month and phase of development.

4. The project will hire about 90 permanent, full-time employees from the local area for project operations.

5. The project will not cause an influx of a significant number of construction or operation workers to permanently relocate to the local area because most of the workers hired through the Project Labor Agreement would reside within commuting distance of the site.

6. There is an adequate supply of hotels/motels and rental properties within the project vicinity to accommodate workers who stay in the area temporarily during the week and commute to their homes on the weekend.

7. The project will not result in significant adverse effects on local employment, housing, schools, public utilities, parks and recreation, law enforcement, or emergency services.

8. The total capital costs of the ISEGS are estimated (in 2007 dollars) at $300 million for Phase I, $280 million for Phase II, and $520 million for Phase III.

9. Construction payrolls are estimated (in 2007 dollars) at $57.7 million for Phase I, $57.1million for Phase II, and $82.3 million for Phase III.

10. The anticipated construction payrolls, the local purchases of materials and supplies, and the sales tax revenues generated by the expenditures will have a temporary beneficial impact on the economies of San Bernardino and Clark Counties.

11. When all three phases of ISEGS are completed, the project will provide an annual operations payroll of approximately $5.4 million (2007 dollars) and an operations and maintenance budget estimated at $340,500 (2007 dollars).

12. The project will generate property tax revenues of approximately $2.2 million (2007 dollars) per year for San Bernardino County.

13. The project owner will pay a one-time statutory school development fee of at least $3,195 to the Baker Valley Unified School District pursuant to Education Code Section 17620.

14. The project will provide direct, indirect, and induced economic benefits to San Bernardino County and surrounding communities.

15. As a result of the updated, smaller footprint for ISEGS Phase III, the number of employees and the potential economic benefits would be reduced proportionately; however, since there are no project-related socioeconomic impacts, the smaller footprint does not change that finding.

16. The minority and low-income population densities, respectively, within a six-mile radius of the project site do not exceed the 50 percent threshold for a screening level environmental justice analysis.

17. The project will not create disproportionate impacts on minority and/or low-income populations because the mitigated project does not result in any significant health or environmental impacts to any population in the project vicinity.

18. Construction and operation of the project will not result in any direct, indirect, or cumulative significant adverse socioeconomic impacts.

CONCLUSIONS OF LAW

1. We therefore conclude that implementation of all Conditions of Certification in this Decision, including the Condition of Certification below, ensures that the project will comply with all applicable laws, ordinances, regulations, and standards relating to socioeconomic factors as identified in the pertinent portions of **Appendix A**.

2. The evidence of record contains an adequate analysis of socioeconomic effects related to the project and establishes that the project will not create any significant adverse socioeconomic effects as defined under the National Environmental Policy Act or the California Environmental Quality Act.

3. The evidence of record contains an adequate analysis of potential socioeconomic effects in accordance with federal and state guidelines on environmental justice and establishes that the project will not create any disproportionate adverse effects on minority or low-income populations.

CONDITION OF CERTIFICATION

SOCIO-1 The project owner shall pay a statutory school development fee of at least $3,195 to the Baker Valley Unified School District as required by Education Code Section 17620.

Verification: At least 30 days prior to start of project construction, the project owner shall provide the Compliance Project Manager (CPM) proof of payment of the statutory school development fee.

D. NOISE AND VIBRATION

The construction and operation of any power plant will create noise. The character and loudness of this noise, the times of day or night during which it is produced, and the proximity of the project to sensitive receptors combine to determine whether project noise will cause significant adverse impacts. In some cases, vibration may be produced as a result of construction activities such as blasting or pile driving; these activities have the potential to cause structural damage and annoyance. The evidence of record summarized below was uncontested and evaluates whether noise and vibration produced during project construction and operation will be mitigated sufficiently to comply with applicable law and avoid the creation of significant adverse impacts. (12/14/2009 RT 305-07; Exs. 1; 57; 65, pp. 79 to 83; 300, § 6.6; 302, pp. 9 to 11; 313, p.9.) The "Mitigated Ivanpah 3" submission does not affect this topic area. (Exs. 88, p. 3.8; 315.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

The project will be constructed on 4,073 acres of federally owned land, administered by the BLM, located in San Bernardino County. The nearest residences are in the town of Primm, Nevada, approximately 4.5 miles away. The Primm Valley Golf Club is about 0.5 miles northeast of the eastern boundary of the Ivanpah 1 phase of the project. (Ex. 300, p. 6.6-5.)

Federal and State Laws regulate worker noise exposure. There are no similar provisions concerning off-site noise in surrounding communities. Even though San Bernardino County ordinances establishing various noise limits are inapplicable since the project is located on federally owned land, the analysis of record uses these noise limits as guidance in evaluating the impacts of ISEGS. (Ex. 300, pp. 6.6-2 to 6.6-3.)

CEQA Guidelines set forth characteristics of noise impacts that may indicate potentially significant effects from project-related noise, such as "a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project." (Cal. Code Regs., tit. 14, § 15000 et seq., Appen. G, Section XI.) In accordance with this standard, the Commission uses the significance threshold of 5 dBA when project-related noise emissions exceed existing ambient noise levels at the nearest sensitive receptor. We believe that an increase in background noise levels of up to 5 dBA in a residential setting is insignificant and that an increase of more than 10 dBA is clearly significant. An

increase of between 5 dBA and 10 dBA may be considered adverse, but could be either significant or insignificant depending upon the particular circumstances of a given case. (Ex. 300, pp. 6.6-4 to 6.6-5.)

Factors considered in determining the significance of an adverse impact as characterized above include: (1) the resulting noise level; (2) the duration and frequency of the noise; (3) the number of people affected; and (4) the land use designation of the affected receptor sites. Noise due to construction activities is usually considered insignificant in terms of CEQA compliance if the construction activity is temporary and the use of heavy equipment and noisy activities is limited to day-time hours. (*Id*.)

The evidence establishes that the nearest potential sensitive receptor, i.e. Primm Nevada, is too distant from ISEGS to be significantly impacted by project noise.[1] (Ex. 300, p. 6.6-5.) Therefore, no ambient monitoring was required. (Ex. 300, p. 6.6-6.) Nevertheless, the evidence illustrates the effects the project's short-term construction activities and its long-term operation will have upon ambient noise levels.

1. Construction

Construction noise is a temporary event, in this instance expected to last about 48 months. High-pressure steam blows are typically the loudest noise encountered during construction. If not silenced, these could create noise levels of roughly 95 dBA at the golf course and 76 dBA at Primm. With a temporary silencer installed, or the use of other measures as provided in Condition **NOISE-7**, the noise levels will be attenuated to no more than 60 dBA and 55 dBA at these locations, respectively. (Ex. 300, pp. 6.6-7 to 6.6-8.) Similarly, pile driving, if used, could create noise levels of nearly 50 dBA at Primm and 58 dBA at the golf course. The evidence shows that these increases will be temporary. (*Id.*)

Construction of the linear facilities progresses rapidly, thus not subjecting any one receptor to noise impacts for more than a few days. Moreover, with the exception of 0.5 mile of gas pipeline and 570 feet of water line, all linear facilities will be within the project site and construction noise impacts will be similar to those for the power plant.

[1] The Primm Valley Golf Club is not considered as noise-sensitive a land use as are residences. (Ex. 300, p. 6.6-5.)

To ensure construction noise levels will not be disruptive at the nearest receptors, we have adopted Conditions of Certification **NOISE-1, NOISE-2,** and **NOISE-6**. The first two Conditions establish a notification and complaint process to resolve issues arising from any excessive construction noise; Condition **NOISE-6** limits construction to the hours between 7:00 a.m. and 7:00 p.m. (Ex. 300, pp. 6.6-6 to 6.6-8.) Overall, the evidence establishes that construction noise levels at Primm and at the golf course will not be annoying. (Ex. 300, p. 6.6-6.)

To protect construction workers from injury due to excessive noise, Condition **NOISE-3** requires the project owner to implement a noise control program consistent with OSHA and Cal/OSHA requirements. Finally, there is no indication in the evidence of record that vibration from construction activities will be perceptible at any appreciable distance from the project site, or that it will cause any impact. (Ex. 300, pp. 6.6-7 to 6.6-8.)

2. Operations

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. (Ex. 300, p. 6.6-9.) The project's primary new noise sources include the steam turbine generators, air cooled condenser fans, transformers, auxiliary boilers, and boiler feed pumps. (Ex. 300, p. 6.6-8.)

The evidence establishes that strong tonal noises could be a source of annoyance. To avoid the creation of pure-tone noises, the project owner will balance the noise emissions of various power plant features such as the steam turbine generators and various pumps and fans. Condition **NOISE-4** ensures that tonal noises will not cause annoyances. (Ex. 300, p. 6.6-10.) As with construction activities, operational and maintenance activities will meet OSHA and Cal/OSHA standards to protect workers. (Condition of Certification **NOISE-5**.) The evidence also establishes that operational vibration – whether ground borne or air borne – will be undetectable by likely receptors. (*Id*.)

3. Cumulative Impacts

Cumulative impacts occur if the ISEGS project's noise combines with that of other local or regional projects. The geographic area potentially impacted by cumulative noise impacts is limited to areas within approximately one-quarter mile of the ISEGS project because noise impacts are generally localized, mainly

within approximately 500 feet from any noise source. At distances greater than one-quarter mile, steady construction noise from the project will generally dissipate into quiet background noise levels. (Ex. 300, pp. 6.6-12 to 6.6-13.)

The FirstSolar photovoltaic project is proposed to be located directly adjacent to the ISEGS site. The nearest noise receptor, as with the ISEGS project, is the Primm Valley Golf Club, located approximately one mile from the FirstSolar photovoltaic project. As discussed above, noise generated during construction of the ISEGS projects could reach levels of 50 to 55 dBA L_{eq} at the Primm Valley Golf Club. Noise from the FirstSolar photovoltaic project could combine with noise generated by the ISEGS project. Because doubling the distance from a noise source reduces the sound pressure level by 6 dB, noise from construction of the FirstSolar project would be expected to be roughly 6 dB quieter at the golf course than noise from ISEGS. Combined construction noise from the two projects would thus reach levels of 51 to 56 dB at the golf course. The evidence establishes that this is an unnoticeable increase over the noise from one project alone, and thus not a source of a "cumulative" impact. (Ex. 300, pp. 6.6-12 to 6.6-13.)

FINDINGS OF FACT

Based on the evidence of record, we make the following findings.

1. The nearest noise receptors are the town of Primm, Nevada (4.5 miles away) and the Primm Valley Golf Club (0.5 mile away).

2. Operation of the ISEGS Project will not significantly increase noise levels above existing ambient levels at the nearest receptors.

3. Construction noise levels are temporary and transitory in nature and will be mitigated to the extent feasible by sound reduction devices, limiting construction to day-time hours, and providing a notice and complaint process to the public.

4. High-pressure steam blows or pile driving could result in increased levels of noise at the nearest receptors.

5. Mitigation, as identified in the evidence of record, and adherence to Condition of Certification **NOISE-7** assure that noise from steam blow or pile driving activities is reduced to below a level of significance.

6. The project owner will implement measures to protect workers from injury due to excessive noise levels during both construction and operation.

7. The ISEGS Project will not create ground or air borne vibrations which will cause significant off-site impacts.

8. Implementation of the Conditions of Certification, below, ensure that project-related noise emissions will not cause significant adverse impacts to the closest noise receptors.

9. The noise from the ISEGS, when combined with that of other foreseeable projects, will not create a significant adverse cumulative impact.

CONCLUSIONS OF LAW

1. The Commission concludes that implementation of the following Conditions of Certification ensure that the ISEGS Project will comply with the applicable laws, ordinances, regulations, and standards on noise and vibration as set forth in the pertinent portion of **Appendix A** of this Decision.

2. The project will not cause significant indirect, direct, or cumulative adverse noise impacts.

CONDITIONS OF CERTIFICATION

NOISE-1 Prior to the start of ground disturbance, the project owner shall notify the operator of the Primm Valley Golf Course, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project and include that telephone number in the above notice. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: At least 15 days prior to ground disturbance, the project owner shall transmit to BLM's Authorized Officer and to the Compliance Project Manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed, describing the method of

that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the ISEGS, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to BLM's Authorized Officer and the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- Take all feasible measures to reduce the noise at its source if the noise is project related; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts; and, if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within 5 days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with BLM's Authorized Officer and the CPM documenting the resolution of the complaint. If mitigation is required to resolve a complaint and the complaint is not resolved within a 3-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to BLM's Authorized Officer and to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal/OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to BLM's Authorized Officer and the CPM the noise control program and the project owner's project manager's signed statement. The project owner shall make the program available to Cal/OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise complaints from residents of Primm, Nevada, or from the operator of the Primm Valley Golf Course. If legitimate project-related noise complaints are received from residents of Primm, the project owner shall perform a noise survey to demonstrate that noise levels due to plant operation do not exceed an average of 45 dBA L_{eq} measured at the nearest residence of the community of Primm, Nevada. If legitimate project-related noise complaints are received from the operator of the Primm Valley Golf Course, the project owner shall perform a noise survey to demonstrate that noise levels due to plant operation do not exceed an average of 55 dBA L_{eq} measured at the nearest boundary of the golf course. No project components creating pure-tone noises may be added to the project unless they are balanced by other plant features. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

A. The measurement of power plant noise for the purposes of demonstrating compliance with this Condition of Certification may alternatively be made at a location, acceptable to BLM's Authorized Officer and the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected location. The character of the plant noise shall be evaluated at the affected residential locations to determine the presence of pure tones or other dominant sources of plant noise.

Verification: The survey shall take place within 30 days of the receipt of the noise complaint unless the complaint has been resolved to the complaining party's statisfaction. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to BLM's Authorized Officer and to the CPM. Included in the survey report shall be a description of additional mitigation measures (if any) necessary to achieve compliance with the above-listed noise limit and a schedule, subject to BLM's Authorized Officer and CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey, the project owner shall submit to BLM's Authorized Officer and the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

NOISE-5 Following each phase (Ivanpah 1, Ivanpah 2, and Ivanpah 3) of the project's first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The surveys shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations sections 5095–5099 and Title 29, Code of Federal Regulations section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare reports of the survey results and, if necessary, identify mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing each survey, the project owner shall submit the noise survey report to BLM's Authorized Officer and the CPM. The project owner shall make the reports available to OSHA and Cal/OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work that causes off-site annoyance as evidenced by the filing of a legitimate noise complaint shall be restricted to the 7:00 a.m. to 7:00 p.m. time period.

Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to BLM's Authorized Officer and the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

STEAM BLOW RESTRICTIONS

NOISE-7 If a high-pressure steam blow is employed, the project owner shall equip steam blow piping with a temporary silencer or take other effective measures that quiet the noise of steam blows to no greater than 60 dBA measured at the Primm Valley Golf Club and no greater than 55 dBA measured at any affected residential locations in Primm, NV. The project owner shall conduct high-pressure steam blows only during the hours of 7:00 a.m. to 7:00 p.m.

If a low-pressure continuous steam blow is employed, the project owner shall limit the noise of steam blows to no greater than 45 dBA measured at any affected residential location in Primm, NV. In lieu of specifying the level of silencing above, the project owner may alternatively submit an analysis to the BLM's Authorized Officer and to the CPM that documents, during either high or low pressure steam blows, steam blow noise levels will not exceed 60 dBA at the Primm Valley Golf Course (day time) or 55 dBA (day time)/45 dBA (night time) at the nearest residential location in Primm.

Verification: At least 15 days prior to the first high pressure steam blow, the project owner shall submit to BLM's Authorized Officer and the CPM drawings or other information describing the temporary steam blow silencer or other noise

attenuating measures to be taken, the noise levels expected, and a description of the steam blow schedule.

At least 15 days prior to any low-pressure continuous steam blow, the project owner shall submit to BLM's Authorized Officer and the CPM drawings or other information describing the process, including the noise levels expected and the projected time schedule, for execution of the process.

NOISE COMPLAINT RESOLUTION FORM

Ivanpah Solar Electric Generating System (07-AFC-5)
NOISE COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number: _____
Date complaint received: _____ Time complaint received: _____
Nature of noise complaint:
Definition of problem after investigation by plant personnel: Date complainant first contacted: _____
Initial noise levels at 3 feet from noise source _____ dBA Date: _____ Initial noise levels at complainant's property: _____ dBA Date: _____ Final noise levels at 3 feet from noise source: _____ dBA Date: _____ Final noise levels at complainant's property: _____ dBA Date: _____
Description of corrective measures taken: Complainant's signature: _____ Date: _____
Approximate installed cost of corrective measures: $ _____ Date installation completed: _____ Date first letter sent to complainant: _____ (copy attached) Date final letter sent to complainant: _____ (copy attached)
This information is certified to be correct: Plant Manager's signature: _____

(Attach additional pages and supporting documentation, as required).

E. VISUAL RESOURCES

Visual resources are the features of the landscape that contribute to the visual character or quality of the environment. CEQA requires an examination of a project's visual impacts in order to determine whether the project has the potential to cause substantial degradation to the existing visual character of the site and its surroundings, substantially affect a scenic vista or damage scenic resources, or create a new source of substantial light or glare affecting day or nighttime views in the area. (Cal. Code Regs., tit. 14 § 15382, Appen. G.)

Key Observation Points (KOPs) are chosen to represent the most critical locations from which the project would be seen. These reflect, in particular, those key sensitive viewer groups and viewing locations most likely to be affected by the project. Project impacts are assessed primarily from these KOPs. (Ex. 300, p. 6.12-9.)

KOPs are rated from low to high using the following interrelated factors: Viewer exposure is a function of, visibility, number of viewers, and duration of the view. It, along with visual quality and view concern, are the components of visual sensitivity of the landscape without the project. The project is introduced via simulations and analyzed for its contrast, dominance, and view blockage in relation to the existing environment. (Ex. 300, pp. 6.12-49—6.12-51.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Background Visual Features

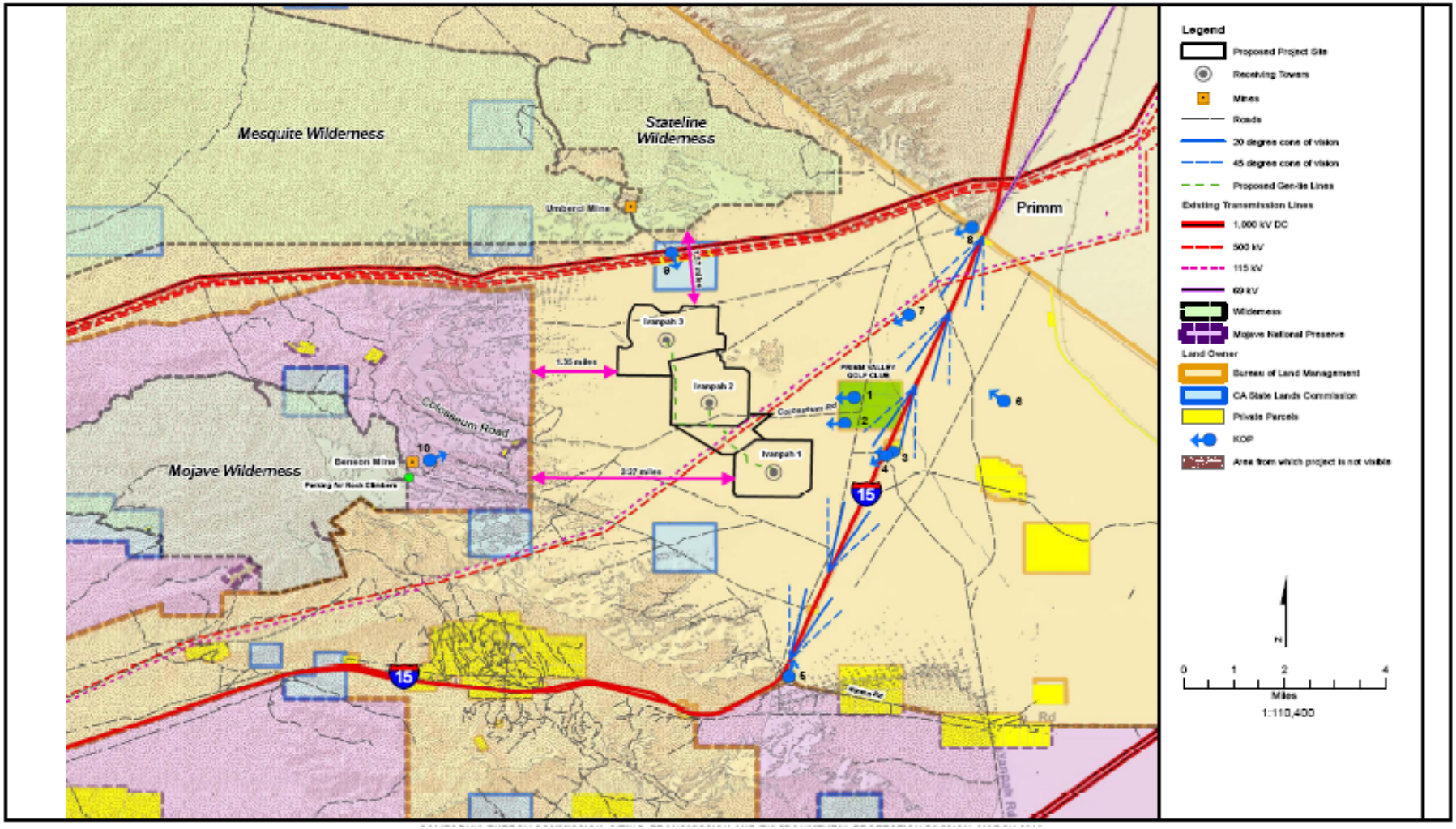
The proposed Ivanpah Solar Electric Generating System (ISEGS) would be built in the Mojave Desert, immediately north and east of the northernmost portions of the Mojave National Preserve. Locally, the site is situated within the Ivanpah Valley, notable for the level playa or dry lakebed of Ivanpah Lake. Steeply rising, barren slopes and ridges of the Clark, Spring, and Ivanpah Mountains to the south, west, and north, and the Lucy Gray, McCullough, and New York Mountains to the east, define the Ivanpah Valley in the project vicinity, creating an enclosed view shed. While the project portion of the Ivanpah Valley is visually relatively intact, it is located roughly 30 miles south of the City of Las Vegas, within a visual corridor along Interstate 15 (I-15) that becomes increasingly urbanized and less scenically intact as one progresses northward. The site is located at the outer edge of urban influence of the City of Las Vegas metropolitan

area. I-15, which is adjacent to the project site, is the principal travel route for visitors to Las Vegas from southern California. (Ex. 300, p. 6.12-7.)

The approximately four square mile ISEGS site lies west of I-15 and the northern half of the Ivanpah Lake dry lakebed. The site occupies a moderately sloping alluvial fan or bajada that descends eastward from the foot of the Clark Mountains and Mojave National Preserve (MNP) immediately to the west. Visual exposure to viewers on I-15, due both to proximity and slope orientation, is thus high. This portion of the Ivanpah Valley is scenically relatively intact. The Bighorn Electric Generating Station, the town of Primm at the north end of the valley, the Primm Golf Course, existing high-voltage power lines, several unpaved vehicular trails and I-15 intrude on the valley's scenic quality but overall those features are very subordinate visually, and the landscape appears predominantly undisturbed. The proposed site is located immediately to the west of the Primm Golf Course, a slightly elevated site who's irrigated landscaping and perimeter berm-slopes contrast conspicuously with the surrounding natural landscape for viewers in its vicinity. The project site also abuts an isolated, 416-foot tall rock formation that serves as a prominent landmark within a radius of several miles and represents a striking scenic feature of the valley.

Land cover on the site consists primarily of Mojave Creosote Bush Scrub, including areas of small, young Joshua Trees. Surface disturbance is relatively minimal and inconspicuous overall, including unpaved vehicular trails and access roads. The ground surface is largely a medium tan color, further darkened in appearance by the relatively uniform scrub groundcover. With the exception of the vivid rock formation at the center of the site, its bajada/scrub landscape is relatively common throughout the Mojave Desert landscape. The prominent and highly scenic adjacent scenery of slopes, ridges and peak of Clark Mountain, however, lend the project view shed as a whole a higher degree of scenic interest and value. Similarly, the contrast between perfectly flat dry lakebed and steep, tall, nearby mountain slopes within a narrow enclosed valley lend the landscape a distinctive character with strong visual unity. (Ex. 300 pp. 6.12-7—6.12-8.) **Visual Resources Figure 1**, below, depicts the project setting, the area from which all or a portion of the project is visible (the view shed), and the relative locations of the KOPs we discuss below.

Visual Resources Figure 1



(Source: Ex. 315, Visual Resources Figure 19.)

Visually, the primary ISEGS features to be introduced to the site are:

1. Three approximately 459 foot power towers, with day and night strobe lighting for aircraft safety and a lightening rod adding an additional 10 feet;
2. Approximately 173,500 12-foot tall heliostat (mirror) arrays;
3. Three steam turbine generators located near the base of the power towers;
4. Three air cooled condensers, the most prominent on the Ivanpah 1 unit, approximately 92 feet high;
5. 16-acre substation;
6. Administrative and maintenance facilities;
7. Water storage tanks; and
8. New transmission line towers.

(Ex. 88, p. 2-2; Ex. 300, p. 6.12-12; Ex. 315, pp. 2-8.)

2. Direct/Indirect Impacts and Mitigation

a. Construction Impacts

Construction activities will occur over approximately 48 months. A 178-acre construction logistics area will be located between Ivanpah units 1 and 2 (see **Project Description Figure 1**). (Ex. 300, pp. 3-11, 3-15, 6.12-14, 6.12-27; Ex. 315, p. 2-10.)

Construction parking and laydown would occur within the units under construction. After Ivanpah 3's construction is complete, associated fabrication buildings would be removed and their areas restored. Grading of the project phases and natural gas pipeline route would result in a very large area of disturbed soil surface, resulting in high color, line and texture contrast that would be prominent from the highway and elevated KOPs. The potential overall affected area of the three proposed project phases would be approximately 4 square miles or 3,582 acres. The majority of this area would eventually be transformed into mirror fields, whose visual impacts are discussed below. Where possible, the applicant will trim vegetation to a height that will not interfere with the operation of the heliostat mirrors rather than remove plants. The graded areas not occupied by mirrors or power generating equipment could continue to have long-term visual impacts, both because native vegetation reestablishes itself very slowly and due to fugitive dust. Nighttime construction lighting, without

adequate mitigation, could result in light pollution affecting the Mojave National Preserve.

These effects together and individually could represent strong visual changes to affected KOPs on I-15 and in the Clark Mountains. (Ex. 300, pp. 6.12-27—6.12-28; Ex. 315, p. 6-9.)

Mitigation. To address potential long-term impacts of site grading, we adopt Condition of Certification **BIO-14**, requiring implementation of a revegetation plan after completion of construction and Condition **VIS-3**, revegetation of disturbed areas to the greatest practical extent pursuant to Condition **BIO-14**. To address potential light pollution impacts, we adopt Condition of Certification **VIS-4**, requiring the minimization of construction lighting that is visible outside of the project site. Potential impacts from fugitive dust have been addressed in Air Quality Conditions **AQ-SC3**, **AQ-SC4**, and **AQ-SC7** and Soil and Water Condition **SOIL&WATER-1**. With the application of these Conditions, construction visual impacts will be reduced to less than significant levels.

b. Operation Impacts

Visual Resources Figure 1 (above) depicts the locations of the ten KOPs selected for visual analysis:

- ***KOP 1*** – Looking Southwest from Primm Valley Golf Course toward Ivanpah 1, (roughly 1 mile).
- ***KOP 2*** – Looking West from Primm Valley Golf Course toward Ivanpah 2 and 3 (roughly 1.5 miles).
- ***KOP 3*** – Looking West from I-15 near Yates Well Road Toward Ivanpah 2 and 3, 2.5 Miles from Ivanpah 2.
- ***KOP 4*** – Looking West from I-15 near Yates Well Road toward Ivanpah 1, 1 Mile from site.
- ***KOP 5*** - Looking Northwest from I-15 at Nipton Road, 4 miles from site.
- ***KOP 6*** – View of Ivanpah 2 and 3 looking west from eastern side of Ivanpah Lake, 4 Miles from Site.
- ***KOP 7*** - Looking southwest toward site from western side of Ivanpah Lake, 3 Miles from Site.
- ***KOP 8*** - Looking South from Primm, 4 Miles from Site.

- ***KOP 9*** – Looking South from Road to Umberci Mine, 1 Mile from Site.

- ***KOP 10*** – Looking East from Vicinity of Benson Mine, 4 Miles from Site.

With the exception of KOPs 9 and 10, the KOP simulations contained in the Final Staff Assessment (Exhibit 300) were not updated to reflect the Applicant's project modification which reduces the number of power towers in Ivanpah 3 from 5 towers to 1 tower. Nonetheless, we find those simulations sufficient to inform our analysis.

1) KOP 1 – Primm Valley Golf Course looking toward Ivanpah 1, (roughly 1.5 miles).

2) KOP 2 – Primm Valley Golf Course toward Ivanpah 2 and 3 (roughly 1.5 miles).

These two KOPs are both taken from the Primm Valley Golf Course, located on I-15 south of Ivanpah Lake and east of the proposed project site. Viewing distances are 1.5 miles to Ivanpah 2, and under 1.0 mile to Ivanpah 1, respectively. These KOPs represent a developed, outdoor recreational viewpoint with moderate to high use, at middle-ground distance. These and other views from the Ivanpah Valley floor, have moderate overall visual sensitivity, with moderate existing visual quality, moderately high viewer concern, and high viewer exposure. (Ex. 300, p. 6.12-9.)

VISUAL RESOURCES FIGURE 2

(Source: Ex. 300, Visual Resources Figure 6)

VISUAL RESOURCES FIGURE 3

(Source: Ex. 300, Visual Resources Figure 8)

As depicted in **VISUAL RESOURCES** Figures 2 and 3, the project would appear very prominently from these near-middle-ground viewpoints. The 459-foot solar collector towers would introduce strong vertical line and form contrast. This form contrast would be strongly accentuated by the bright illumination of the heated solar collector at the top of each tower, as well as by rays of reflected sunlight when ambient dust particles are present in the surrounding air. The solar collector towers and adjacent air-cooled condenser, as well as the substation and related facilities south of Ivanpah 2, would present a utilitarian, industrial character. The panoramic expanse of mirror arrays would present strong textural contrast with the intact, natural character of the desert floor. Portions of the desert floor below the mirror arrays, where visible, would contrast in hue, brightness and value with surrounding undisturbed soil surfaces, and with the mirror structures themselves. When present, reflected light rays would create a luminous, transparent surface of tent-like form that would to some degree repeat that of the mountain ridgeline, would have a legible form with high unity. To some observers this could be perceived as an interesting and vivid, albeit man-made, sight. At other times in the absence of the light rays, the view of the solar tower and mirror fields would be more purely utilitarian in character, both less dominant and less picturesque. Under sunny conditions, the bright lighting of the solar receiver units would be very conspicuous, and may tend to visually dominate views due to their brightness. (Ex. 300, pp. 6.12-17 – 6.12-18.)

In addition to this strong level of contrast, the project would exhibit strong spatial and scale dominance. The vast scale of the project would be such that it could not be taken in a single view.

While the project would not physically block existing scenic views of Clark Mountain, it would strongly alter their character due to the brightness of the solar receivers, and would interfere with the ability of viewers to look toward the mountain due to strong levels of discomfort glare. This would be a moderately strong to strong level of view blockage in the direction of Clark Mountain and a strong level of overall visual change. The project would demand attention, could not be overlooked, and would be dominant in the landscape.

Impact Significance. Considering the moderate overall visual sensitivity, this strong level of visual change is a potentially significant impact.

Mitigation. Views of the proposed project from the golf course could be partially or substantially screened by perimeter tree plantings. Such screening would also tend to block the panoramic natural views of the Clark Mountains that are the location's scenic attraction, however. Partial screening of the project with low-

growing trees or tall shrubs would screen views of the mirror fields from within the golf course while leaving views of the Clark Mountains intact as well as views of the tower and light rays. Screening only quadrants containing views of the project (northwest to southwest) could leave scenic views eastward over Ivanpah Lake and mountains to the east intact. These measures are described in Condition of Certification **VIS-2**, which requires consultation with the golf course's owner in the design of an appropriate screening plan.

Potential contrast of the mirror arrays will be mitigated by painting the non-mirror surfaces in a non-reflective tan or brown color to blend with the visual background of the surrounding terrain and the slopes of the Clark Mountains, as described in Condition of Certification **VIS-1**.

After implementation of Conditions **VIS-1** and **VIS-2**, impacts to viewers at Primm Valley Golf Course will be reduced to a less-than-significant levels.

3) KOP 3 – I-15 near Yates Well Road toward Ivanpah 2 and 3, 2.5 Miles from Ivanpah 2.

4) KOP 4 – I-15 near Yates Well Road toward Ivanpah 1, 1 Mile from site.

I-15 views are all within the valley and, as described above, have moderate overall sensitivity. Viewer numbers on this segment of highway are extremely high, particularly on Friday evenings and other peak periods, although the recreational destination for the majority of such motorists is Las Vegas rather than the Mojave Desert and the level of concern with scenic quality thus likely to be moderate or low. Viewing distance ranges from background (over four miles) to near- middle-ground (approximately one mile).

KOPs 3 and 4 together show the overall panorama seen from viewpoints in the portion of I-15 nearest to the project. (Ex. 300, p. 6.12-9.)

VISUAL RESOURCES FIGURE 4

(Source: Ex. 300, Visual Resources Figure 9)

VISUAL RESOURCES FIGURE 5

(Source: Ex. 300, Visual Resources Figure 10)

As depicted in Figures 4 and 5, the project would be highly prominent from this near-middle-ground viewpoints. The tall solar collector towers would introduce strong vertical form and line contrast. This form contrast would be strongly amplified by bright illumination of the heated solar receiver at the top of each tower, as well as by light rays of reflected sunlight when ambient dust particles are present in the surrounding air. The mirror arrays would alter the character of the desert floor to a distinctly man-made texture, including the mechanical structures of mirror units closest to the viewer, and the bright, reflective mirror surfaces visible beyond the solar towers. Although the form and line contrast of the mirror arrays would be weak, the textural contrast they would introduce is strong due to the vast scale and visual magnitude of the affected area, which is so broad that it could not be seen in one view.

In addition to this strong level of contrast, the project would exhibit strong spatial and scale dominance as evidenced by the inability to take in the whole of the project in a single view.

The project would not physically obstruct existing scenic views of Clark Mountain due to the low height of the mirror fields, and the relatively large distances between the vertical solar power towers. However, the very bright solar receiver units could tend to dominate or even interfere with such views.

The combination of strong contrast, strong spatial and scale dominance, and strong view blockage represent a strong level of overall visual change. The panoramic expanse of man-made texture on the ground plane, together with strong form contrast of the power towers and strong color contrast of glowing receivers and mirror surfaces would demand attention and would fundamentally alter the perceived character of the existing landscape from an intact natural setting to distinctly man-altered setting.

Impact Significance - This strong level of overall visual change would not be compatible with the moderate overall sensitivity level of the Ivanpah Valley as seen by motorists in the visual middle-ground. These effects are thus a potentially significant visual impact.

Mitigation – No available mitigation measures were identified to fully address the level of contrast of the project. However, Condition of Certification VIS-1, requiring color treatment of structures to minimize structure contrast, especially of the mirror arrays, will reduce those significant impacts to the greatest degree feasible, but not to insignificant levels. (Ex. 300, pp. 6.12-19 – 6.12-20.)

5) KOP 5 - Northwest from I-15 at Nipton Road, 4 miles from site.

KOP 5 depicts views of I-15 motorists as they enter the Ivanpah Valley from the south at background distance (roughly 4 miles). This viewpoint demonstrates the high level of visual exposure toward I-15 created by the site's eastward sloping bajada topography, and represents I-15 views at their farthest point from the project site.

Contrast of the project at this farthest viewpoint on I-15 is moderate, rapidly increasing to strong contrast as motorists progress northward. Visual exposure to the site is high until motorists reach the Primm Valley Golf Course, which obstructs highway views to the site.

Project dominance would remain moderate (co-dominant) at this distance. Scale and prominence of the mirror fields would be large but co-dominant within the overall field of view. View blockage would be moderate from this location. The bright solar receivers would strongly attract attention, but would appear largely to the right (east) of Clark Mountain, the principal object of scenic views.

Overall, the project would exhibit moderate visual change from this and other background distance viewpoints.

While the majority of motorists on I-15 are not highly concerned with the scenic quality of the setting, their very high numbers (up to 40,000 per day) argues against characterizing this KOP as having low sensitivity. BLM guidelines, for example, assign a high level of sensitivity where 40,000 vehicles per *year* visit a vicinity. We adopt staff's recommend rating of moderate overall visual sensitivity, including a moderately high level of viewer concern. Further supporting that approach is the designation of the affected segment of I-15 within the project view shed as a county scenic route.

Impact Significance – If considered only when the project first becomes visible to motorists, the moderate contrast would be compatible with the moderate overall sensitivity and be less than significant. However, as motorists progressed northward, visual exposure of the project would remain high and contrast and dominance would increase to strong levels. Although no intermediate locations on I-15 were simulated, for the greater part of the drive between Nipton Road and Yates Well Road, which occurs within the middle-ground distance zone (under 3 miles), contrast would be strong, and impacts potentially significant.

VISUAL RESOURCES FIGURE 6

(Source: Ex. 300, Visual Resources Figure 11)

Mitigation – No available mitigation measures were identified to fully address these impacts. Condition **VIS-1**, requiring surface color treatment of structures to minimize structure contrast, will reduce the visual impacts to the greatest degree feasible. The impacts will remain significant after mitigation.

6) KOP 6 – Looking west from eastern side of Ivanpah Lake, 4 Miles from Site.

7) KOP 7 - Looking southwest from western side of Ivanpah Lake, 3 Miles from Site.

KOP 6 is taken from the most heavily used access point for wind sailors, on the eastern side of the dry lakebed. KOP 7 is taken from a second, also heavily used wind sailing access point on the west side of the lakebed, west of I-15. These KOPs represent a natural, outdoor recreational viewpoint with very high use at far middle-ground/background distances of 4 and 3 miles respectively. (Ex. 300, p. 6.9-10.)

As depicted in **Visual Resources Figure 7**, because of distance and the relatively oblique vertical angle of view, the mirror arrays would occupy a narrow portion of the field of view, appearing relatively flat from Ivanpah Lake viewpoints such as KOPs 6 and 7. Form, line and color contrast of the mirror fields would thus be relatively weak for KOP 6, weak to moderate for KOP 7. The vertical 459-foot towers and bright glow of solar receivers would have greater line and color contrast but would remain moderate and co-dominant with other features in the view. Light rays, when present as depicted in the simulation, would be prominent, but would remain generally subordinate within the overall view. Based on currently available data, project contrast would range from weak to moderate depending on prevalence of light rays and brightness of solar receivers.

Due particularly to the low, oblique viewing angle, project visual scale and spatial dominance would remain subordinate to other prominent components of the view from this location.

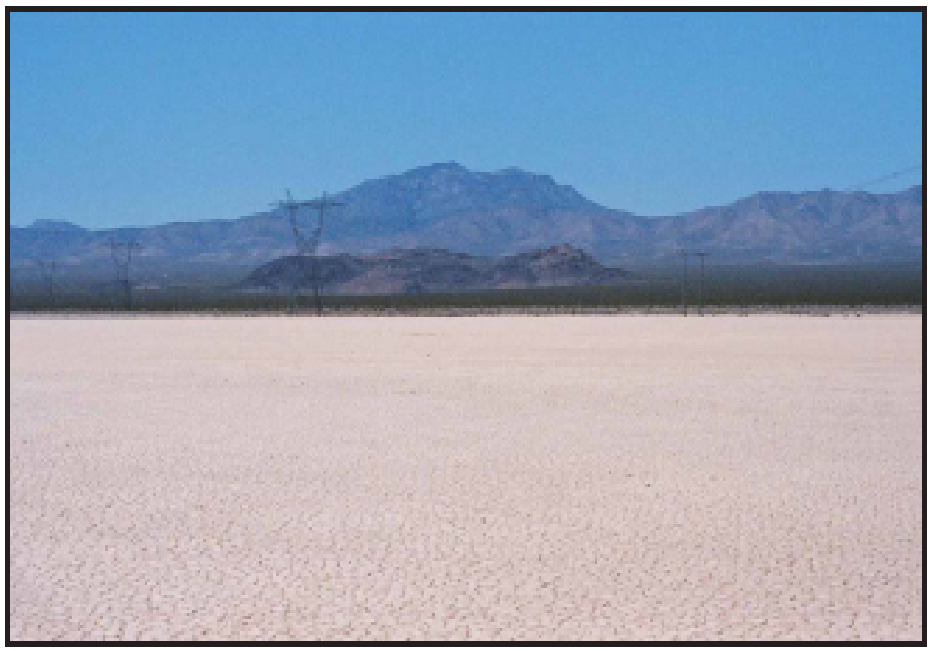
The bright power tower receivers would intrude into views of Clark Mountain. However at this distance they are anticipated to have a moderate level of view intrusion.

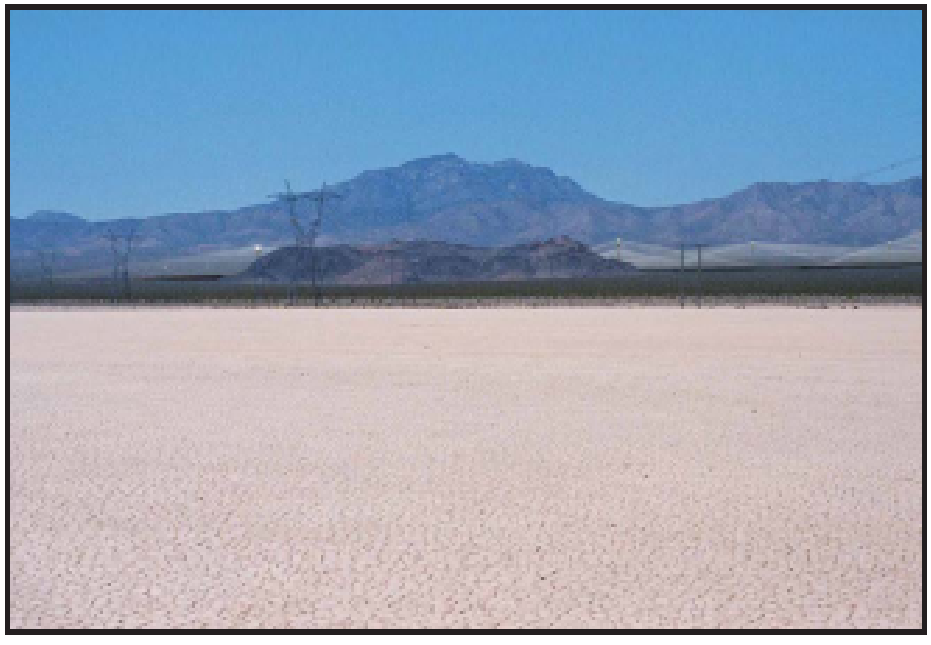
Overall visual change would thus be moderate under sunny conditions, and weak during cloudy conditions.

VISUAL RESOURCES FIGURE 7

(Source: Ex. 300, Visual Resources Figure 12)

VISUAL RESOURCES FIGURE 8





(Source: Ex. 300, Visual Resources Figure 13)

Impact Significance – The weak to moderate levels of overall project visual change would be compatible with the moderate overall visual sensitivity of the setting from this viewpoint. Impacts would thus be less than significant. No mitigation is required. (Ex. 300, pp. 6.12-22 – 6.12-23.)

8) KOP 8 — South from Primm, 4 Miles from Site.

Primm is a high-volume visitor destination within middle-ground distance of the project. Viewer exposure and sensitivity from this indoor activity-oriented KOP is relatively low, and existing visual quality, dominated by large parking areas and commercial development, is also relatively low. Nevertheless, open and scenic views toward the project site exist from various locations in the southern area of Primm. (Ex. 300, p. 6.9-10.)

Existing visual quality within Primm, dominated by large parking areas and commercial development, is also relatively low. In addition, views toward the project site from this location would be essentially similar to those of KOP 7 (Ivanpah Lake), except from a greater distance (over 4 miles rather than 3 miles). Thus no simulation from this location was prepared.

Similar to KOP 7 the mirror fields would be viewed at a relatively oblique vertical angle, reducing their overall prominence in the field of view. The solar receiving towers would be prominent due to the intense brightness of the illuminated solar receivers atop each tower. In the absence of reflected light rays, the project structures would remain visually subordinate to other features in the view, including the existing transmission towers, and their overall level of contrast would be weak to moderate. In the presence of light rays as depicted in the simulation, contrast would be moderate.

Due to the oblique angle of view from this location, visual dominance of the project would remain subordinate to other components of the view.

The bright power tower receivers would intrude into views of Clark Mountain. However at this distance they are anticipated to have a moderate level of view intrusion. Overall visual change would thus be moderate under sunny conditions, and weak during cloudy conditions.

Impact Significance – The weak to moderate levels of overall project visual change would be compatible with the moderate overall visual sensitivity of the setting from this viewpoint. Impacts are therefore less than significant. (Ex. 300, p. 6.12-24.)

9) KOP 9 – South from the Road to Umberci Mine, 1 Mile from Site.

Portions of the project view shed in the Clark Mountain Range, which bounds the valley to the north, west, and south are within either the Mojave National Preserve or Stateline and Mesquite BLM Wilderness Areas. The fact that these areas are designated for special status under the Desert Protection Act (DPA) reflects their unusually high scenic and recreational value.

Both the Mojave National Preserve (MNP) and BLM Wilderness Areas (WAs) are regarded as high viewer concern locations due to their special designated status. This fact is amplified by the high visitor numbers reported by the National Park Service in surveys of visitors to the Clark Mountains cited below. This, in combination with the exceptional scenic quality of the mountains in both the MNP and WAs, and the high project visibility from these elevated viewpoints, results in a high overall sensitivity rating.

KOP 9 is a popular hiking destination from Primm and the northern part of the valley, located on the trail to Umberci Mine within the Stateline Wilderness Area. It represents a sensitive recreational viewpoint at middle-ground distance. (Ex. 300, pp. 6.12-10 – 6.12-11.)

Visual Resources Figure 9, depicts Ivanpah 2 and Ivanpah 3 as viewed from KOP 9; Ivanpah 1 would appear to the left of the photo frame. The reduction in acreage of Ivanpah 3 and the elimination of four of its originally proposed five power towers, has reduced, in absolute terms, the impacts from this KOP. Nonetheless, the expanse of the project remains incapable of depiction in a single photo frame. It continues to have strong special dominance, increasing as viewers gain elevation compared to the relatively low elevation and oblique viewing angle of Figure 9. The three remaining power towers are expected to have a strong visual contrast.

Impact Significance –This strong level of overall project visual change would not be compatible with the moderate overall visual sensitivity of the Ivanpah Valley, nor with the high overall visual sensitivity of the Stateline Wilderness Area in which this viewpoint is located. This level of impact is thus significant although considerably improved over the originally proposed project.

Mitigation – No available mitigation measures were identified to fully address these impacts. Treatment of the structures, required by Condition of Certification VIS-1, will reduce impacts to some degree, but not sufficiently to fully mitigate the impacts. (Ex. 300, pp. 6.12-24 – 6.12-26; Esx. 315, pp. 6-6 – 6-7.)

VISUAL RESOURCES FIGURE 9

(Source: Ex. 315, Visual Resources Figure 17)

10) KOP 10 – East from Vicinity of Benson Mine, 4 Miles from Site.

KOP 10, located in the vicinity of the Benson Mine, is representative of visitors to the MNP using or passing through the east face of Clark Mountain. According to the most recent statistical survey of MNP visitors conducted in 2003 for the National Park Service, approximately 51,915 individuals visit the Clark Mountain vicinity. KOP 10 is thus reasonably representative of the views enjoyed by a substantial proportion of these visitors, who include rock climbers, hikers, hunters, and OHV drivers traveling on Yates Well, Colosseum, or other open access roads in the vicinity of the KOP. It is an elevated, high sensitivity recreational viewpoint at background distance. (Ex. 300, pp. 6.12-10 – 6.12-11.)

Visual Resources Figure 10, depicts Ivanpah 2 and Ivanpah 3 and a portion of Ivanpah 1 as viewed from KOP 10. The reduction in acreage of Ivanpah 3 and the elimination of four of its originally proposed five power towers, has reduced, in absolute terms, the impacts from this KOP. The remaining project features would continue to display a strong level of form, line, color and texture contrast into a wide portion of the field of view. In this view, the spatial visual magnitude and dominance of the mirror fields appears greater than that of Ivanpah Dry Lake. The mirror fields would vary in their appearance from dark blue to very bright diffuse glare depending on light conditions, season, and time of day. At certain times the mirror arrays could potentially create strong diffuse or spread glare, particularly in the morning if viewed on axis with the sun, and in late afternoon. Bright receiver glare is anticipated during all sunny periods.

Overall, project visual change would remain strong from elevated viewpoints in the Clark Mountains. The project would demand attention, could not be overlooked, and would be dominant in the landscape.

Impact Significance – This strong level of project contrast would not be compatible with the moderate overall visual sensitivity of the Ivanpah Valley, nor with the high overall visual sensitivity of the Mojave Preserve in which this viewpoint is located. A decline in scenic quality of visitors' views would result. This level of impact is thus significant.

Mitigation – No available mitigation measures were identified to fully address these impacts. Treatment of the structures, required by Condition of Certification VIS-1, and revegetation of disturbed areas (Condition **VIS-3**) will reduce impacts to some degree, but not sufficiently to fully mitigate the impacts. (Ex. 300, pp. 6.12-26 – 6.12-27; Ex. 315, pp. 6-7 – 6-9.)

VISUAL RESOURCES FIGURE 10

(Source: Ex. 315, Visual Resources Figure 18)

3. Glare Impacts

Glare is of concern in part for aesthetic reasons, but also for navigation and safety reasons due to the proximity of Highway I-15, and to aircraft flight paths associated with both existing facilities and with the anticipated future Southern Nevada Supplemental Airport to be located a short distance north of the project near Jean, Nevada. Potentially affected receptors would include aircraft, motorists on I-15; hikers, climbers and other visitors in the Clark Mountains; and off-road vehicle (ORV) operators, wind sailors, hikers and others in the valley. A more thorough discussion of this issue may be found in the Traffic and Transportation section of this Decision.

Based on its analysis of the potential health and safety hazards or potential for distraction from both the heliostats and power tower receivers staff testified that solar radiation and light reflected from proposed project heliostats could cause a significant human health and safety hazard to observers in vehicles on adjacent roadways or flying above the site, and could cause a distraction of drivers on I-15 that would lead to road hazards. We adopt Staff proposed Condition of Certification **TRANS-3** to ensure solar radiation and light from the heliostats does not impair the vision of motorists or pilots traveling near the site and that the potential for exposure of observers does not cause a human health and safety hazard.

Staff also testified that solar radiation and light reflected from proposed project power tower receivers is not expected to pose a significant human safety or hazard to navigation of vehicles on adjacent roadways or air traffic flying above the site, but could potentially cause a distraction of drivers on I-15 that would lead to road hazards. We adopt Staff proposed Condition of Certification TRANS-4 to ensure glare from power tower receivers does not impair the view of motorists or pilots traveling near the site and that the potential for exposure of observers to light reflected from the power tower receivers is minimized to the maximum extent possible. Even so mitigated, the glare could remain conspicuous as is discussed regarding the individual KOPs, above.

4. Cumulative Impacts and Mitigation

A project may result in a significant cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. (Cal. Code Regs., tit. 14, § 15130.)

There is the potential for substantial future development in the Ivanpah Valley area and throughout the southern California Mojave desert region. Known and foreseeable future projects are summarized in the Cumulative Scenarios Section of the Staff's Analysis. (Ex. 300, pp. 5-11 – 5-14.)

Cumulative impacts could occur if implementation of the ISEGS project would combine with those of other local or regional projects. The ISEGS project is potentially associated with two types of cumulative impact:

- cumulative impacts within the immediate project view shed, essentially comprising foreseeable future projects in the Ivanpah Valley; and

- cumulative impacts of foreseeable future solar and other renewable energy projects within the southern California Mojave Desert, or other broad basin of the project's affected landscape type. The widest applicable basin of cumulative effect would include all of the Mojave Desert landscape type, including southeastern California, southern Nevada, and western Arizona.

Local Projects (Ivanpah Valley). Past and present projects in the Ivanpah Valley become elements of the baseline or existing project setting. There we describe the existing Ivanpah Valley setting as "scenically relatively intact."

Past projects included in the baseline are the existing railroad track, the Primm Valley Golf Course, a transmission line, the I-15 freeway, the Bighorn electric generating station, Chevron-Texaco evaporation pond and commercial development in Primm, NV.

The locations of existing and reasonably foreseeable developments in the Ivanpah Valley are presented in the the Cumulative Scenario section of Exhibit 300 (pp. 5-11 – 5-17) listing foreseeable future projects within the Ivanpah Valley. All of the projects listed in Cumulative Impacts Table 3, with the exception of the mixed-use development near Jean, Nevada, and the two wind energy projects on Mountain Pass, would lie within the view shed of the ISEGS project. The Ivanpah Airport would be located at a sufficiently great distance as to have limited visual interaction with the ISEGS project. On the other hand, the ISEGS, GEN 3, and Nextlight Primm solar projects, along with the existing Bighorn Generating Station, proposed Ivanpah Energy Project, and City of Primm, would simultaneously be visible within middle-ground distance to I-15 motorists, and also be cumulatively dominant from viewpoints in the Clark Mountains, including KOP 10, within the Mojave National Preserve. This cumulative effect would be substantially more adverse than the significant direct impacts of the ISEGS

project alone, or the future projects without ISEGS, both from I-15 and from the Preserve.

For I-15 motorists the cumulative effect of the existing Primm Valley Golf Course together with the ISEGS, I-15 Widening, Port of Entry, and Desert Xpress projects would be substantially adverse, converting the majority of the western highway frontage within the valley to a more urbanized, developed foreground view with potential to intrude into scenic westward highway views of the Clark Mountains. Detailed plans of the Port of Entry Project were not available to us.. However, if it is of a scale and character similar to other like facilities staff is familiar with, that project could be of considerable scale and visual effect, including not only the port structures themselves, but a large area of additional lanes and other paving, numerous trucks, and bright night lighting. The Desert Xpress project, whose specific technology is likewise unknown, would likely require continuous above-ground catenary power lines that are highly urban in character, similar to light rail systems, as well as continuous safety fencing and other ancillary project features. If a final alignment paralleling the edge of I-15 were to be selected, these continuous vertical and linear features could intrude into the foreground of views of Clark Mountain as seen from the highway. Additional lane widening of I-15 proposed by Caltrans would add incrementally to these urbanizing influences, by increasing the dominance of the highway itself. Other foreseeable projects include the proposed natural gas-fired combined cycle Ivanpah Energy Center Project, which would be prominent from the highway; and most importantly, two additional solar projects, which like ISEGS would be extensive in area, adding substantially to the amount of development in the valley as seen from I-15 and the Clark Mountains. These projects, taken together, would result in a marked transformation of the existing Ivanpah Valley landscape into a more urbanized visual setting, particularly as seen by I-15 motorists in the northern portion of the valley in the vicinity of the ISEGS project. In addition, there would be some likelihood of cumulative light pollution impacts due to an accumulation of night-time light sources, including the ISEGS aircraft lighting, Port of Entry and new and existing power plant lighting.

The anticipated impacts of the ISEGS project in combination with foreseeable future local projects in the Ivanpah Valley are therefore cumulatively considerable and significant. (Ex. 300, pp. 6.12-31 – 6.12-33.)

5. Regional Impacts Beyond the Project Viewshed

Staff asserts that cumulative viewed impacts across the entire Mojave desert must be considered and concludes that, the ISEGS project, when combined with past and foreseeable future projects will have significant visual impacts in the California portion of the Mojave Desert. (Ex. 300, pp. 6.12-31 – 6.12-32.)

We decline to cast such a wide net in our cumulative impact analysis. Staff's analysis demonstrates that is not possible to do more than speculate in general terms about the nature of regional impacts. The parties have cited no authority compelling a particular exercise of our discretion in this regard. We find it appropriate to define a single area for the cumulative analysis, not two areas as staff suggests. That area, for this topic and project area is the project view shed, which is discussed above. The concern over the denegration of view sheds is adequately addressed by our analysis of direct and cumulative impacts to the project's view shed.

6. LORS compliance

As is discussed in the LORS section of this Decision, the project will conform with all applicable laws, ordinances, regulations and standards relating to **Visual Resources**.

7. Public Comment

Several commentors expressed a concern about the effect that construction night lighting might have on people attempting to observe the night skies. Condition of Certification VIS-4 requires that all temporary construction and operational lighting be designed to minimize light visibility from outside of the project site.

FINDINGS OF FACT

Based on the evidence, we find and conclude as follows:

1. Construction will occur over approximately 48 months.
2. The project's temporary construction activities' impact on visual resources will be mitigated to a less than significant impact with the effective implementation of Condition of Certification **VIS-3**.
3. ISEGS's new source of substantial light to nighttime views will be less than significant with the effective implementation of the applicant's specified mitigation measures and Condition of Certification **VIS-4**.

4. There is no identified scenic resource on the project site and there is no defined scenic resource identified in the vicinity of the project site that the proposed project would substantially damage.

5. All ISEGS equipment other than the solar arrays will have non-reflective surfaces and neutral colors such that the project structures will not be a source of substantial glare that could adversely affect daytime views

6. The project's potential impacts on visual resources were analyzed from 10 defined key observation points (KOPs) at different locations surrounding the project site

7. ISEGS will result in significant adverse visual impacts on scenic vistas in the Clark Mountains, the Mojave Preserve and Stateline Wilderness Areas and, to scenic views toward Clark Mountain as seen from I-15 (from KOPs 3, 4, 5, 9, and 10).

8. There will be no significant adverse impacts to visual resources from ISEGS linears. No long-term visual impacts will occur as a result of the construction of the pipeline and transmission line.

9. The visual effects of the ISEGS in combination with past, present, and reasonably foreseeable projects in the area are not in the same viewshed as the ISEGS so they will not be cumulatively considerable. The ISEGS project will not result in significant cumulative impacts.

CONCLUSIONS OF LAW

1. Implementation of the following Conditions of Certification will reduce the significant direct, indirect, or cumulative impacts to visual resources.

2. Significant, unmitigated visual impacts will remain after implementation of the Conditions of Certification.

3. The project will comply with all applicable laws, ordinances, regulations and standards regarding project design, architecture, landscaping, signage, and other requirements related to Visual Resources.

CONDITIONS OF CERTIFICATION

SURFACE TREATMENT OF PROJECT STRUCTURES AND BUILDINGS

VIS-1 The project owner shall treat the surfaces of all project structures and buildings visible to the public such that a) their colors minimize visual intrusion and contrast by blending with the existing tan and brown color of the surrounding landscape; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with

local policies and ordinances. The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive.

The project owner shall submit for CPM review and approval, a specific Surface Treatment Plan that will satisfy these requirements. The treatment plan shall include:

A. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes;

B. A list of each major project structure, building, tank, pipe, and wall; the transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;

C. One set of color brochures or color chips showing each proposed color and finish;

D. A specific schedule for completion of the treatment; and

E. A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the project owner receives notification of approval of the treatment plan by BLM's Authorized Officer and the CPM. Subsequent modifications to the treatment plan are prohibited without BLM's Authorized Officer and CPM approval.

Verification: At least 90 days prior to specifying to the vendor the colors and finishes of the first structures or buildings that are surface treated during manufacture, the project owner shall submit the proposed treatment plan to BLM's Authorized Officer and the CPM for review and approval and simultaneously to San Bernardino County for review and comment. If BLM's Authorized Officer and the CPM determine that the plan requires revision, the project owner shall provide to BLM's Authorized Officer and the CPM a plan with the specified revision(s) for review and approval by BLM's Authorized Officer and the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to BLM's Authorized Officer and the CPM for review and approval.

Prior to the start of commercial operation, the project owner shall notify BLM's Authorized Officer and the CPM that surface treatment of all listed structures and buildings has been completed and they are ready for inspection and shall submit to each one set of electronic color photographs from the same key observation points identified in (d) above. The project owner shall provide a status report regarding surface treatment maintenance in the Annual Compliance Report. The report shall specify a): the condition of the surfaces of all structures and buildings at the end of the reporting year; b) maintenance activities that occurred during the reporting year; and c) the schedule of maintenance activities for the next year.

LANDSCAPE SCREENING OF GOLF COURSE

VIS-2 At the request of, and in consultation with BLM's Authorized Officer, the CPM and the golf course owner, the project owner shall prepare a perimeter landscape screening plan to reduce the visibility of the proposed ISEGS project as seen from the golf course. The intent of the plan shall be to provide screening of the power project, particularly the mirror fields, while retaining as much of the scenic portion of the overall views of Ivanpah Valley and Clark Mountains as feasible. The design approach shall be developed with prior consultation with the golf course owner, and implemented only at the golf course owner's request. The project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the golf course owner for review and comment a preliminary conceptual landscaping plan whose objective is to provide an attractive visual screen to views of the ISEGS project mirror fields. Upon approval by BLM's Authorized Officer and the CPM and golf course owner, the project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the golf course owner for review and comment a landscaping plan whose proper implementation will satisfy these requirements. The plan shall include:

A. A detailed landscape, grading, and irrigation plan, at a reasonable scale. The plan shall demonstrate how the requirements stated above shall be met. The plan shall provide a detailed installation schedule demonstrating installation of as much of the landscaping as early in the construction process as is feasible in coordination with project construction.

B. A list (prepared by a qualified professional arborist familiar with local growing conditions) of proposed species, specifying installation sizes, growth rates, expected time to maturity, expected size at five years and at maturity, spacing, number, availability, and a discussion of the suitability of the plants for the site conditions and mitigation objectives, with the objective of providing the widest possible range of species from which to choose;

C. Maintenance procedures, including any needed irrigation and a plan for routine annual or semi-annual debris removal for the life of the project;

D. A procedure for monitoring for and replacement of unsuccessful plantings for the life of the project; and

E. One set each for BLM's Authorized Officer and the CPM of 11"x17" color photo-simulations of the proposed landscaping at five years and twenty years after planting, as viewed from adjoining segments of I-15 .

The plan shall not be implemented until the project owner receives final approval from BLM's Authorized Officer and the CPM.

Verification: The landscaping plan shall be submitted to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the golf course owner for review and comment at least 90 days prior to installation of the landscaping. If BLM's Authorized Officer and the CPM determine that the plan requires revision, the project owner shall provide to BLM's Authorized Officer and the CPM and simultaneously to the golf course owner a revised plan for review and approval by BLM's Authorized Officer and the CPM.

The planting must occur during the first optimal planting season following site mobilization. The project owner shall simultaneously notify BLM's Authorized Officer and the CPM and the golf course owner within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

The project owner shall report landscape maintenance activities, including replacement of dead or dying vegetation, for the previous year of operation in each Annual Compliance Report.

REVEGETATION OF DISTURBED SOIL AREAS

VIS-3 The project owner shall revegetate disturbed soil areas to the greatest practical extent, as described in Condition of Certification **BIO-14**. In order to address specifically visual concerns, the required Closure, Revegetation and Rehabilitation Plan shall include reclamation of the area of disturbed soils used for laydown, project construction, and siting of the substation and other ancillary operation and support structures.

Verification: Refer to Condition of Certification **BIO-14**.

TEMPORARY AND PERMANENT EXTERIOR LIGHTING

VIS-4 To the extent feasible, consistent with safety and security considerations, the project owner shall design and install all permanent

exterior lighting and all temporary construction lighting such that a) lamps and reflectors are not visible from beyond the project site, including any off-site security buffer areas; b) lighting does not cause excessive reflected glare; c) direct lighting does not illuminate the nighttime sky, except for required FAA aircraft safety lighting; d) illumination of the project and its immediate vicinity is minimized, and e) the plan complies with local policies and ordinances. The project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the County of San Bernardino for review and comment a lighting mitigation plan that includes the following:

A. Location and direction of light fixtures shall take the lighting mitigation requirements into account;

B. Lighting design shall consider setbacks of project features from the site boundary to aid in satisfying the lighting mitigation requirements;

C. Lighting shall incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated;

D. Light fixtures that are visible from beyond the project boundary shall have cutoff angles that are sufficient to prevent lamps and reflectors from being visible beyond the project boundary, except where necessary for security;

E. All lighting shall be of minimum necessary brightness consistent with operational safety and security; and

F. Lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied.

Verification: At least 90 days prior to ordering any permanent exterior lighting or temporary construction lighting, the project owner shall contact BLM's Authorized Officer and the CPM to discuss the documentation required in the lighting mitigation plan. At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the County of San Bernardino for review and comment a lighting mitigation plan. If BLM's Authorized Officer and the CPM determine that the plan requires revision, the project owner shall provide to BLM's Authorized Officer and the CPM a revised plan for review and approval by BLM's Authorized Officer and the CPM.

The project owner shall not order any exterior lighting until receiving BLM Authorized Officer and CPM approval of the lighting mitigation plan.

Prior to commercial operation, the project owner shall notify BLM's Authorized Officer and the CPM that the lighting has been completed and is ready for inspection. If after inspection, BLM's Authorized Officer and the CPM notify the project owner that modifications to the lighting are needed, within 30 days of receiving that notification the project owner shall implement the modifications and notify BLM's Authorized Officer and the CPM that the modifications have been completed and are ready for inspection.

Within 48 hours of receiving a lighting complaint, the project owner shall provide BLM's Authorized Officer and the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify BLM's Authorized Officer and the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to BLM's Authorized Officer and the CPM within 30 days.

VIII. OVERRIDE FINDINGS

Our analysis of the Ivanpah Solar Electric Generating System (ISEGS) project finds that it will have several significant unmitigated environmental impacts. Before approving the project, the California Environmental Quality Act (CEQA) requires that we make certain findings. We address that requirement as follows:

The applicable CEQA requirement is contained in Public Resources Code Section 21081:

> "21081. Pursuant to the policy stated in Sections 21002 and 21002.1, no public agency shall approve or carry out a project for which an environmental impact report has been certified which identifies one or more significant effects on the environment that would occur if the project is approved or carried out unless both of the following occur:
>
> (a) The public agency makes one or more of the following findings with respect to each significant effect:
>
> (1) Changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment.
>
> (2) Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency.
>
> (3) Specific economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or alternatives identified in the environmental impact report.
>
> (b) With respect to significant effects which were subject to a finding under paragraph (3) of subdivision (a), the public agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment."

1. Significant Project Impacts

As identified and discussed in the specific topic sections of this Decision, we find that ISEGS will have the following significant environmental impacts:

- **Biological Resources**. The creation of protected areas for the ten special-status plant species that could otherwise be directly impacted by construction of ISEGS, reduces most of the impacts to those plants to

insignificant levels. Two plants (Mojave milkweed and desert pincushion), however, are distributed throughout the project site and cannot be protected by those means. Though Commission staff testified to a willingness to "accept a limited amount of uncertainty" regarding whether impacts to those two species would be mitigated, we, in an abundance of caution, find the potential impacts to be significant.

- **Land Use**. The contribution of ISEGS, in combination with the many other renewable energy projects proposed for the Ivanpah Valley and Mojave Desert, to the loss of desert lands, is cumulatively significant. Lands formerly available for multiple uses—habitat, grazing, recreation, and open space—would no longer be available for those uses once a power plant is constructed.
- **Traffic and Transportation**. Neither construction nor operation of the ISEGS project would have a significant impact on the local or regional road network, except for northbound Interstate 15 (I-15) on Friday afternoons and evenings. Project related vehicle trips occurring during that time window contribute to a significant cumulative impact by adding traffic to an already overloaded and congested I-15 that is already operating at Level of Service F and result in an unmitigable impact.
- **Transmission Systems Engineering**. For the power grid to accommodate the generation from ISEGS, the System Impact Study indicates that it is necessary to replace an approximately 36-mile portion of the Eldorado – Ivanpah leg of the existing Eldorado-Baker-Cool Water–Dunn Siding-Mountain Pass 115 kV transmission line and with a new 36-mile long, 220 kV double circuit transmission line. In doing so, special-status plant species habitat may be lost due to construction activities. That loss would be a significant impact. At this point, lacking precise information on the location of transmission line towers and the methods of construction, it cannot be determined whether it is possible to avoid or mitigate the potential impacts. Without that information, we assume that the impact is significant.
- **Visual Resources**. The ISEGS project would result in the installation of a large, industrial facility in a highly visible and scenic area of the Mojave Desert. We find significant visual impacts from several Key Observation Points in the Ivanpah Valley, Clark Mountains, and along I-15.

2. Project Benefits

The ISEGS project, if constructed and operated as proposed, will provide the following benefits to California and its residents:

- ISEGS will provide 370 MW (assuming the construction of all three phases) of renewable energy power, which will assist in meeting California's Renewable Portfolio Standard, which specifies that retail

- ISEGS will assist the state in meeting its ambitious Greenhouse Gas reduction targets by generating 370 MW of electricity with vastly lower greenhouse gas emissions than existing fossil fuel burning generating facilities.

- By generating electricity with the use of a small amount of fossil fuels, ISEGS will reduce California's dependence on fossil fuels, a diminishing energy source.

- ISEGS will provide construction jobs for an average and peak workforce of 474 and 959, respectively, and approximately 90 jobs during operations. Most of those jobs will require highly trained workers.

- With total capital costs for Ivanpah 1, 2, and 3 estimated to be $1.1 billion, construction of ISEGS will provide a boost to the economy from the purchase of major equipment, payroll, and supplies. Approximately $ 5.7 million will be spent annually during project operations. Additional indirect benefits will result from these expenditures as well.

3. Comparison of Project Alternatives

As is discussed in the Alternatives section, none of the project alternatives will significantly reduce the project impacts. The no project alternative, which would eliminate the project's impacts, would also eliminate its benefits. The distributed solar energy (photovoltaic or thermal) generation and other renewable technologies are required *in addition to* large scale projects such as this in order to meet the Renewable Portfolio Standard; the two complement, rather than compete with, each other.

FINDINGS OF FACT

Based on the evidence and the conclusions drawn in other sections of this Decision, we make the following findings and conclusions

1. Climate change poses a serious threat to the economic well-being, public health, natural resources, and the environment of California.

2. The proposed project will have the following significant impacts which cannot be mitigated to insignificant levels:

a. The potential loss of habitat for the Mojave milkweed and desert pin cushion due to construction and operation of the project.

b. The cumulative loss of multiple use lands in the Ivanpah Valley and Mojave Desert due to the approval of this project.

c. A cumulative contribution to traffic levels on northbound I-15 on Friday afternoons and evenings, a time when I-15 is already overcrowded and congested.

d. The potential loss of special status plant species habitat during the removal and construction of a replacement transmission line on a 36 mile portion of the Eldorado – Ivanpah leg of the existing Eldorado-Baker-Cool Water–Dunn Siding-Mountain Pass 115 kV transmission line.

e. Degredation of scenic vistas for motorists, recreationists, hikers, and others from various points in the Ivanpah Valley, Clark Mountains, Mojave Preserve, and Stateline Wilderness Area.

3. This Decision imposes all feasible mitigation measures to reduce the significant impacts of the project to the lowest possible, though still significant, levels.

4. The project will provide the following benefits:

a. 370 MW of renewable energy power will contribute in meeting California's Renewable Portfolio Standard.

b. Results in a significant reduction in greenhouse gas emissions over existing fossil fuel-burning generating facilities.

c. Reduces California's dependence on fossil fuels.

d. Creation of construction jobs for an average and peak workforce of 474 and 959, respectively, and approximately 90 jobs during operations, most requiring highly trained workers.

e. Expenditures of approximately $1.1 billion of capital and annual expenditures of approximately $ 5.7 million

5. Of the identified Alternatives, only the no project alternative would reduce the impacts of the proposed project but it would also eliminate its benefits.

CONCLUSION OF LAW

1. The above described project benefits outweigh the significant impacts identified above.

2. It is appropriate to approve the ISEGS project despite its remaining significant environmental impacts.

3. As shown in the record, much of the debate over the ISEGS project was over the significant adverse impacts to biological resources of the Ivanpah Valley, specifically the federally-listed threatened species, desert tortoise and eight special-status plants found on the project site. There was general agreement by wildlife, botanical, and ecology experts that testified at the evidentiary hearings that there is a combination of both natural and manmade processes that are affecting the global climate; and that these special-status species are not immune to the effects of climate change, but it is possible that they could adapt and survive if given enough time. There was also general agreement that the exact impacts of climate change to the biological resources in the Ivanpah Valley are unknown – various models predict varying temperature changes and precipitation amounts for California's desert region – resulting in potential detriment or benefit to biological resources, depending on the habitat needs of the species. (1/12/2010 RT 34-73.) It is the intent of this Commission to take all reasonable measures to preserve the continued existence of the desert special-status species. This Commission believes that this project, and other renewable energy projects, will result in the reduction of greenhouse gases which will help curb or reduce the impact of climate change to California, thereby allowing for the continued existence of the desert special-status species.

4. Therefore, this decision overrides the remaining significant unavoidable impacts that may result from this project, even with the implementation of the required mitigation measures described in this decision.

Appendix A: *Laws, Ordinances, Regulations, and Standards*

Appendix B: *Exhibit List*

Appendix C: *Proof of Service List*

APPENDICES

AIR QUALITY

Applicable LORS	*Description*
Federal	
40 Code of Federal Regulations (CFR) Part 52	Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement is delegated to MDAQMD. Prevention of Significant Deterioration (PSD) requires major sources or major modifications to major sources to obtain permits for attainment pollutants. The ISEGS project is a new source that has a rule listed emission source thus the PSD trigger levels are 100 tons per year for NOx, VOC, SO_2, PM2.5 and CO. This project's proposed emissions are below NSR and PSD applicability thresholds.
40 CFR Part 60	New Source Performance Standards (NSPS), Subpart Da Standards of Performance for Electricity Steam Generation Units. Establishes emission standards and monitoring/recordkeeping requirements for units with greater than 250 MMBtu/hr heat input. Subpart Db Standards of Performance for Electricity Steam Generation Units. Establishes emission standards and monitoring/recordkeeping requirements for units with greater than 100 MMBtu/hr heat input. Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Establishes emission standards for compressions ignition internal combustion engines, including emergency fire water pump engines.
40 CFR Part 93 General Conformity	Requires determination of conformity with State Implementation Plan for Projects requiring federal approvals it project annual emissions are above specified levels.
State	
Health and Safety Code (HSC) Section 40910-40930	Permitting of source needs to be consistent with Air Resource Board (ARB) approved Clean Air Plans.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.
California Code of Regulations (CCR) Section 93115	Airborne Toxics Control Measure for Stationary Compression Ignition Engines. Limits the types of fuels allowed, established maximum emission rates, establishes recordkeeping requirements on stationary compression ignition engines, including emergency fire water pump engines.
Local (Mojave Desert Air Quality Management District, MDAQMD)	
Rule 201 and 203 Permits Required	Required a Permit to Construct before construction of an emission source occurs. Prohibits operation of any equipment that emits or controls air pollutant without first obtaining a permit to operate.
Rules 401, 402, 403, and 403.2 Nuisance, Visible Emissions, Fugitive Dust	Limits the visible, nuisance, and fugitive dust emissions and would be applicable to the construction period of the project.
Rule 404 Particulate Matter - Concentration	Limits the particulate matter concentration from stationary source exhausts.
Rule 900 Standard of Performance for New Stationary Source	Incorporates the Federal NSPS (40 CFR 60) rules by reference.

Applicable LORS	***Description***
Regulation XII – Federal Operating Permits	Requires new or modified major facilities, or facilities that trigger NSPS, Acid Rain or other federal air quality programs obtain a Title V federal operating permit.
Rule 1210 – Acid Rain	Requires facilities subject to the federal Acid Rain program obtain permits and comply with emissions and monitoring provisions.
Rule 1303 New Source Review	Specifies BACT/Offsets technology and requirements for a new emissions unit that has potential to emit any affected pollutants.
Rule 1306 Electric Energy Generating Facilities	Describes actions to be taken for permitting of power plants that are within the jurisdiction of the Energy Commission.

ALTERNATIVES

California Environmental Quality Act (CEQA)

Energy Commission staff is required by agency regulations to examine the "feasibility of available site and facility alternatives to the Applicant's proposal which substantially lessen the significant adverse impacts of the proposal on the environment." (Cal. Code Regs., tit. 20, § 1765.)

The "Guidelines for Implementation of the California Environmental Quality Act," Title 14, California Code of Regulations, Section 15126.6(a), requires an evaluation of the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project."

In addition, the analysis must address the No Project Alternative. (Cal. Code Regs., tit. 14, § 15126.6[e].) The analysis should identify and compare the impacts of the various alternatives, but analysis of alternatives need not be in as much detail as the analysis of the proposed project.

The range of alternatives is governed by the "rule of reason," which requires consideration only of those alternatives necessary to permit informed decision making and public participation. CEQA states that an environmental document does not have to consider an alternative if its effect cannot be reasonably ascertained and if its implementation is remote and speculative. (Cal. Code Regs., tit. 14, § 15126.6[f][3].) However, if the range of alternatives is defined too narrowly, the analysis may be inadequate. (*City of Santee v. County of San Diego* [4th District, 1989] 214 Cal. App. 3d 1438.)

BrightSource Energy, Inc. proposes to build the ISEGS solar facility on federal land within the jurisdiction of the Bureau of Land Management (BLM). Since the BLM is a federal agency and the California Energy Commission has State authority to approve thermal power plants, the ISEGS power plant is subject to review under both NEPA and CEQA.

National Environmental Policy Act Criteria

NEPA requires that the decision-makers and the public be fully informed of the impacts associated with the proposed project. The intent is to make good decisions based on understanding environmental consequences, and to take actions to protect, restore, and enhance the environment. NEPA requires that an EIS consider all reasonable alternatives, those that are practical or feasible from the technical and economic standpoint and from using common sense, rather than simply desirable from the standpoint of the applicant (NEPA's 40 Questions, 1A).

NEPA requires that reasonable alternatives are not limited to ones the lead agency can adopt, and the agency should consider wide-reaching alternatives when the problem at hand is a broad one, such as a large-scale energy supply issue. (See *Natural Resources Defense Council, Inc. v. Morton* (D.C. Cir. 1972) 458 F.2d 827, 836 ("*Morton*").) Further, "[i]n determining the scope of alternatives to be considered, the emphasis is on what is 'reasonable' rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative..." (CEQ Forty Questions, No. 2a.) However, alternatives identified must be consistent with BLM's purpose and need for the action under consideration, which include consideration of the applicant's objectives.

Consideration of the "no action" alternative is mandated by the NEPA. As with the CEQA "no project" alternative, this is the scenario that would exist if the proposed project were not constructed.

BIOLOGICAL RESOURCES

Applicable LORS	*Description*
Federal	
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species, and their critical habitat.
Migratory Bird Treaty (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act.
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request state certification that the proposed activity will not violate state and federal water quality standards.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	This law provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.
California Desert Protection Act of 1994	An Act of Congress which established 69 wilderness areas, the Mojave National Preserve, expanded Joshua Tree and Death Valley National Monuments and redefined them as National Parks. Lands transferred to the National Park Service were formerly administered by the BLM and included substantial portions of grazing allotments, wild horse and burro Herd Management Areas, and Herd Areas.
California Desert Conservation Area Plan	The California Desert Conservation Area (CDCA) comprises one of two national conservation areas established by Congress at the time of the passage of the Federal Land and Policy Management Act (FLPMA). The FLPMA outlines how the BLM will manage public lands. Congress specifically provided guidance for the management of the CDCA and directed the development of the 1980 CDCA Plan.

Applicable LORS	*Description*
Northern and Eastern Mojave (NEMO) Desert Management Plan	As an amendment to the CDCA Plan, the BLM produced the Northern and Eastern Mojave (NEMO) Desert Management Plan (BLM 2002). This document consists of proposed management actions and alternatives for public lands in the NEMO Planning Area. This area encompasses 3.3 million acres and is located in the Mojave Desert in southeastern California adjacent to Nevada. The area borders Nevada on the east, Fort Irwin and the West Mojave (WEMO) Planning Area on the west, and I-40 and the Northern and Eastern Colorado (NECO) Planning Area on the south. The ISEGS site is located in the southeastern portion of the NEMO Planning Area Boundary.
State	
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations Title 14, section 670.7).
Nest or Eggs (Fish and Game Code section 3503)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.
Birds of Prey (Fish and Game Code section 3503.5	Unlawful to take, possess, or destroy any birds in the orders Falconiformes and Strigiformes or to take, possess, or destroy the nest or eggs of any such bird.
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.

Applicable LORS	*Description*
California Environmental Quality Act (CEQA), CEQA Guidelines Section 15380	CEQA defines rare species more broadly than the definitions for species listed under the state and federal Endangered Species Acts. Under section 15830, species not protected through state or federal listing but nonetheless demonstrable as “endangered” or “rare” under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG’s Special Animals List.
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Designates state rare, threatened, and endangered plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq. and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited. In the Ivanpah area, such plants include cacti, yuccas, and catclaw acacia (*Acacia greggii*).
Local	
San Bernardino County General Plan: Conservation/Open Space Element of the County General Plan (County of San Bernardino, 2007)	Includes objectives to preserve water quality and open space to benefit biological resources, and specific policies and goals for protecting areas of sensitive plant, soils and wildlife habitat and for assuring compatibility between natural areas and development. Although ISEGS is not located on lands under county jurisdiction, the general plan provides objectives which are consistent with some of the LORS listed above.

CULTURAL RESOURCES

Applicable LORS	*Description*
Federal	
36 CFR Part 800, implementing regulations of Section 106 of the National Historic Preservation Act	This regulation requires Federal agencies to take into account the effects of a proposed action on cultural resources.
National Environmental Policy Act (NEPA): Title 42, USC, section 4321-et seq.	This statute requires Federal agencies to consider potential environmental impacts of projects with Federal involvement and to consider appropriate mitigation measures.
Federal Land Policy and Management Act (FLPMA): Title 43, USC, section 1701 et seq.	This statute requires the Secretary of the Interior to retain and maintain public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric water resource, and archeological values [Section 1701(a)(8)]; the Secretary, with respect to the public lands, shall promulgate rules and regulations to carry out the purposes of this Act and of other laws applicable to public lands [Section 1740].
Federal Guidelines for Historic Preservation Projects, Federal Register 44739-44738, 190 (September 30, 1983)	The Secretary of the Interior has published a set of Standards and Guidelines for Archeology[1] and Historic Preservation. These are considered to be the appropriate professional methods and techniques for the preservation of archeological and historic properties. The Secretary's standards and guidelines are used by Federal agencies, such as the Forest Service, the Bureau of Land Management, and the National Park Service. The California Office of Historic Preservation refers to these standards in its requirements for selection of qualified personnel and in the mitigation of potential impacts to cultural resources on public lands in California.
Executive Order 11593 May 13, 1971 (36 Federal Register 8921)	This order mandates the protection and enhancement of the cultural environment through providing leadership, establishing state offices of historic preservation, and developing criteria for assessing resource values.

[1] Laws, ordinances, regulations, standards, and organizations may use different spellings of the word archaeology/archeology. Both spellings are acceptable in the English language (Morris 1976). Citations of LORS or the names of organizations will always use the spelling as it appears in the LORS or name.

Applicable LORS	*Description*
American Indian Religious Freedom Act; Title 42, USC, Section 1996	Protects Native American religious practices, ethnic heritage sites, and land uses.
Native American Graves Protection and Repatriation Act (1990); Title 25, USC Section 3001, et seq.,	The stature defines “cultural items,” “sacred objects,” and “objects of cultural patrimony;” establishes an ownership hierarchy; provides for review; allows excavation of human remains, but stipulates return of the remains according to ownership; sets penalties; calls for inventories; and provides for the return of specified cultural items.
U.S. Dept. of the Interior, Bureau of Land Manage-ment (BLM), the California Desert Conservation Area Plan 1980 as amended (CDCA)– Cultural Resources Element Goals	1. Broaden the archeological and historical knowledge of the CDCA through continuing efforts and the use of existing data. Continue the effort to identify the full array of the CDCA’s cultural resources.
	2. Preserve and protect representative sample of the full array of the CDCA’s cultural resources.
	3. Ensure that cultural resources are given full consideration in land use planning and management decisions, and ensure that BLM-authorized actions avoid inadvertent impacts.
	4. Ensure proper data recovery of significant (National Register of Historic Places-quality) cultural resources where adverse impacts cannot be avoided.
State	
Public Resources Code 5097.98 (b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the Native American Heritage Commission-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance.
California Health and Safety Code, Section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.

Applicable LORS	*Description*
Local	
County of San Bernardino 2007 General Plan, Conservation Element, Goal CO 3 and Policies 3.1–3.5	The cultural and paleontological resources goal of the County is to preserve and promote its historic and prehistoric cultural heritage. The County intends to achieve this goal through the implementation of policies that identify and protect important archaeological and historic cultural resources in areas of the county that have been determined to have known cultural resource sensitivity, and on all lands where disturbance of previously undisturbed ground will occur. The County will, further, establish programs to preserve the information and heritage value of cultural and historical resources, comply with California Government Code Section 65352.2 (SB18) on all General Plan and specific plan actions, and ensure that important cultural resources are avoided or minimized to protect Native American beliefs and traditions.

FACILITY DESIGN

Applicable LORS	*Description*
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards
State	2007 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	San Bernardino County regulations and ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

GEOLOGY, PALEONTOLOGY AND MINERALS

Applicable LORS	*Description*
Federal	
Federal Land Policy and Management Act (FLPMA) of 1976	Provides for the immediate and future protection and administration of public lands in the California desert within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality. This Statute requires the Secretary of the Interior to retain and maintain public lands in a manner that will protect the quality of Scientific, scenic, historical, ecological, environmental, air and atmospheric, water resources and archeological values.
General Mining Law of 1872	Declared all valuable mineral deposits in lands belonging to the United States to be free and open to exploration and purchase. This law remains the method for disposal of minerals in Federal lands that are not specifically provided for in later mineral leasing and sales laws.
Materials Act of July 31, 1947	Authorizes the sale of certain materials, including sand, stone, gravel, and common clay from public lands, if not otherwise expressly authorized or prohibited by law.
Surface Resources Act of 1955	Defined common varieties of sand, stone, gravel, and other materials and authorized the Government to manage and dispose of any land and surface resources that are not incident to mining on unpatented mining claims.
Mining Claims Rights Restoration Act of August 11, 1955	Permits the mining, development, and utilization of mineral resources on all public lands withdrawn or reserved for power development.
Classification and Multiple Use Act of 1964	Authorized the Secretary of the Interior to classify and Manage Bureau of Land Management land for retention or disposal, and for multiple use, including specification of dominate uses and preclusion of inconsistent uses in an area.
Mining and Mineral Policy Act of 1970	Declared that the Federal Government policy is to encourage private enterprise in the development of a sound and stable domestic mineral industry, domestic mineral deposits, minerals research, and methods for reclamation in the minerals industry.
California Desert Conservation Area (CDCA) Plan	Defines multiple-use classes for BLM-managed lands in the CDCA, which includes the land area encompassing the proposed project location.
Northern and Eastern Mojave Desert Management Plan (NEMO) Amendment	The purpose of this amendment to the CDCA Plan was to evaluate land use changes necessary to protect threatened and endangered species.

Applicable LORS	*Description*
Antiquities Act of 1906 (16 United States Code [USC], 431-433	The proposed ISEGS is located entirely on federal (Bureau of Land Management) land. Although there is no specific mention of natural or paleontological resources in the Act itself, or in the Act's uniform rules and regulations (Title 43 Part 3, Code of Federal Regulations [43 CFR Part 3], 'objects of antiquity' has been interpreted to include fossils by the National Park Service (NPS), the Bureau of Land Management (BLM), the Forest Service (USFS), and other Federal agencies. All design will also need to adhere to any applicable BLM design standards.
Omnibus Bill (HR 554) and Paleontological Resources Preservation Act, of March 30, 2009	Provides for the protection and preservation of Paleontological Resources.
Title 43 Code of Federal Regulations	Regulate the management of Public Lands.
State	
California Building Code (2007)	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control). The CBC has adopted provisions in the International Building Code (IBC).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), Section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. The site is not located within a designated Alquist-Priolo Fault Zone.
The Seismic Hazards Mapping Act, PRC Section 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC, Chapter 1.7, Sections 5097.5, 5097.9 and 30244	Regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Warren-Alquist Act, PRC, Sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission to "give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites…" With respect to paleontological resources, the Energy Commission relies on guidelines from the Society for Vertebrate Paleontology (SVP), indicated below.

Applicable LORS	*Description*
California Environmental Quality Act (CEQA), PRC Sections 15000 et seq., Appendix G	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.
Society for Vertebrate Paleontology (SVP), 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
California Surface Mining and Reclamation Act (SMARA)	Requires local governments with California to regulate mining operations, and to develop planning policies that balance mineral production with maintenance of environmental quality.
Local	
San Bernardino County General Plan	Mandates compliance with a number of development standards, including safety requirements. The county also incorporates standards and provisions established by the CBC (2007).
San Bernardino County 2007 Development Code, Chapter 82.20	Defines criteria for site evaluation for paleontological and cultural resources in the county, including preliminary field surveys, monitoring during construction, and specimen recovery; also defines qualifications for professional paleontologists.
California Surface Mining and Reclamation Act (SMARA)	San Bernardino County is the lead agency for SMARA within the County, and issues permits and regulates salable mineral operations.

LIVESTOCK GRAZING - (FEDERAL LAWS)

Potentially Applicable LORS	***Description***
Federal	
Taylor Grazing Act of June 28, 1934	Congress passed the Taylor Grazing Act in 1934 to direct occupancy and use of public rangelands, to preserve natural resources from destruction or unnecessary injury, provide for the orderly use, improvement, and development of rangelands.
Federal Land Policy and Management Act (FLPMA)	Section 202 of FLPMA requires BLM to develop and maintain land use plans for public lands, which in turn identify lands that are available for the issuance of permits or leases for grazing.
Public Rangelands Improvement Act (PRIA)	Defines rangeland, establishes a national policy to improve the condition of rangelands, requires a national inventory of rangelands, and authorizes funding for range improvement projects.
43 CFR Section 4100	Regulations under which BLM administers its grazing program.
California Desert Conservation Area (CDCA) Plan	Defines Multiple-Use Classes for BLM-managed lands in the CDCA, which includes the land area encompassing the proposed project location.
Northern and Eastern Mojave Desert Management Plan (NEMO)	An amendment to the CDCA Management Plan, the NEMO Plan establishes standards and guidelines for grazing activities in the NEMO Planning Area.

WILD HORSES AND BURROS

Applicable LORS	***Description***
Federal	
Wild and Free-Roaming Horse and Burro Act (1971)	Requires the inventorying of populations to establish Appropriate Management Levels (AMLs), and defines procedures to be used for the management and adoption of individuals in order to maintain AMLs. Prohibits harassment or injury to individuals.
Federal Land Policy and Management Act (FLPMA)	Modifies the Wild and Free-Roaming Horse and Burro Act to allow the use of helicopters in herd management.
Public Rangelands Improvement Act (PRIA)	Modifies the Wild and Free-Roaming Horse and Burros Act by defining “excess animals”, and by modifying inventory procedures and adoption standards.
California Desert Conservation Area (CDCA) Management Plan	Establishes 17 Herd Management Areas (HMAs), including the Clark Mountain HMA in the proposed project area.
Northern and Eastern Mojave Desert Management Plan (NEMO)	The NEMO Plan amends the CDCA Plan by reducing the Appropriate Management Level (AML) for burros in this area from 44 to 0.

HAZARDOUS MATERIALS MANAGEMENT

Applicable LORS	*Description*
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Establishes a nationwide emergency planning and response program, and imposes reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA Section on Risk Management Plans (42 USC §112(r)	Requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.800	Requires that the suppliers of hazardous materials prepare and implement security plans in accordance with U.S. Department of Transportation (DOT) regulations.
49 CFR Part 1572, Subparts A and B	Requires that suppliers of hazardous materials ensure that their hazardous material drivers comply with personnel background security checks.
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.
Title 49, Code of Federal Regs., Part 190	Outlines gas pipeline safety program procedures.
Title 49, Code of Federal Regulations, Part 191	Addresses the transportation of natural and other gases by pipeline. Requires preparation of annual reports, incident reports, and safety-related condition reports. Also requires operators of pipeline systems to notify the U.S. Department of Transportation DOT) of any reportable incident by telephone and submit a follow-up written report within 30 days.

Applicable LORS	*Description*
Title 49, Code of Federal Regulations, Part 192	Addresses transportation of natural and other gases by pipeline: Requires minimum federal safety standards, specifies minimum safety requirements for pipelines, and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction, which must be followed for Class 2 and Class 3 pipelines, and requirements for preparing a pipeline integrity management program.
6 CFR Part 27	The CFATS (Chemical Facility Anti-Terrorism Standard) regulation of the U.S. Department of Homeland Security (DHS) that requires facilities that use or store certain hazardous materials to submit information to the DHS so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (Cal-ARP) requires the preparation of a Risk Management Plan (RMP) and Off-site Consequence Analysis (OCA) and submittal to the local Certified Unified Program Authority (CUPA) for approval.
Title 8, California Code of Regulations, Section 5189	Requires facility owners to develop and implement effective safety management plans to ensure that large quantities of hazardous materials are handled safely. While these requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.
Title 8, California Code of Regulations, Section 5189	Sets forth requirements for design, construction, and operation of the vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes including the American Society for Material Engineering (ASME) Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1, and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia but are also used to design storage facilities for aqueous ammonia.

Applicable LORS	***Description***
California Health and Safety Code, Section 41700	Requires that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
LOCAL	
	San Bernardino County does not have additional LORS that apply to Hazardous Materials Handling, but administers the State of California programs as the CUPA. The San Bernardino County Fire Department (SBCFD) acts as the Certified Unified Program Authority (CUPA), and is responsible for reviewing Hazardous Materials Business Plans. With regard to seismic safety issues, the proposed ISEGS site is located in Seismic Risk Zone 4. The construction and design of buildings and vessels storing hazardous materials would meet the seismic requirements of the Uniform Building Code (BSE2007a, section 5.5.2.4).

WILD HORSES AND BURROS – (FEDERAL LAWS)

Applicable LORS	***Description***
Federal	
Wild and Free-Roaming Horse and Burro Act (1971)	Requires the inventorying of populations to establish Appropriate Management Levels (AMLs), and defines procedures to be used for the management and adoption of individuals in order to maintain AMLs. Prohibits harassment or injury to individuals.
Federal Land Policy and Management Act (FLPMA)	Modifies the Wild and Free-Roaming Horse and Burro Act to allow the use of helicopters in herd management.
Public Rangelands Improvement Act (PRIA)	Modifies the Wild and Free-Roaming Horse and Burros Act by defining “excess animals”, and by modifying inventory procedures and adoption standards.
California Desert Conservation Area (CDCA) Management Plan	Establishes 17 Herd Management Areas (HMAs), including the Clark Mountain HMA in the proposed project area.
Northern and Eastern Mojave Desert Management Plan (NEMO)	The NEMO Plan amends the CDCA Plan by reducing the Appropriate Management Level (AML) for burros in this area from 44 to 0.

LAND USE – Table 1

Applicable LORS	*Description*
Federal Bureau of Land Management	California Desert Conservation Area (CDCA) Plan Northern and Eastern Mojave (NEMO) Desert Management Plan Code of Federal Regulations Title 40; § 1508.27 Code of Federal Regulations Title 43; §1610.5-3, 2800 Federal Land Policy and Management Act (1976)
State	***There are no state land use LORS for this project***
Local	San Bernardino County General Plan San Bernardino County 2007 Development Code

LAND USE
Existing Land Uses and General Plan Designations

Project Component	*Existing Land Uses*	*Land Management or General Plan Land Use and Zoning Designations*
Site Vicinity	SCE 115kV transmission line is located adjacent to the site boundary in a southwest to northeast orientation. The Kern River Gas Transmission Company line is located less than a half mile from the Ivanpah 3 boundary. Both utilities are within designated Utility Corridors for major utilities.	**BLM** Multiple-Use Class L Limited Use Designated Utility corridor **San Bernardino County General Plan and Development Code Land Use Zones** Resource Conservation (RC)
ISEGS Site	The project site is mostly undeveloped, vacant land. Existing transmission lines cross the project site in a southwest to northeast orientation between Ivanpah 1 and Ivanpah 2. These transmission lines exist within Utility Corridor BB, a two-mile wide corridor approved in the CDCA Plan for use for transmission lines, pipelines, and other linear utilities. The project site also covers portions of Utility Corridor D. Colosseum Road passes through the southeast portion of Ivanpah 2 and travels in a west to southwesterly direction. Unpaved dirt roads also cross the project site, some of which are located adjacent to the transmission lines. No additional development is present on the site.	**BLM** Multiple-Use Class L Limited Use Designated Utility corridor **San Bernardino County General Plan and Development Code Land Use Districts** Resource Management District and Resource Conservation (RC)
Gas Line	Onsite and offsite gas lines are located on structurally undeveloped land. The Ivanpah 1 gas line would cross under existing transmission	**BLM** Multiple-Use Class L Limited Use **San Bernardino County General Plan and**

	lines. The gas lines would cross an existing unpaved road.	**Development Code Land Use Districts** Resource Management District and Resource Conservation (RC)
Transmission Lines	Onsite and offsite transmission lines would be located for the most part within the site boundary, those linears that extend outside of the site boundary are located within existing rights-of-way.	**BLM** Multiple-Use Class L Limited Use **San Bernardino County– General Plan and Development Code Land Use Districts** Resource Management District and Resource Conservation (RC)

LAND USE Table 3
Applicable Federal and Local LORS Consistency

LORS	***Goals/Objectives/Policy***	***Consistency Determination***
California Desert Conservation Area Plan (CDCA)	The CDCA plan is the land use guide for management of public lands and resources within the CDCA. Public lands designated MUC L are managed to provide lower-intensity, carefully controlled multiple use of resources while ensuring that sensitive values (cultural, scenic, biological resource) are not significantly diminished.	**Consistent**. The CDCA Plan allows for use of Multiple-Use Class L and M lands for solar power projects after NEPA requirements are met, and once the facility is identified as an element of the Plan through the Plan Amendment process. This Environmental Impact Statement acts as the mechanism for meeting NEPA requirements, and also provides the analysis required to support a Plan Amendment identifying the facility within the Plan.
San Bernardino County General Plan Applicable Conservation and Open Space Elements Goals, Objectives, Programs	GOAL CO-8: The County will minimize energy consumption and promote safe energy extraction, uses and systems to benefit local regional and global environmental goals.	**Consistent.** Development of the project would result in a renewable (solar) source of energy that would avoid for the most part the consumption of fossil fuel natural resources for power production, and thereby comply with these goals and policies. The project would help the state meet its goals for renewable electricity generation.
	CO 8.1: Maximize the beneficial effects and minimize the adverse effects associated with the siting of major energy facilities. The County will site energy facilities equitably in order to minimize net energy use and consumption of natural resources, and avoid inappropriately burdening certain	**Consistent**. The project would avoid burdening communities and would reduce natural gas consumption through use of renewable power.

	communities. Energy planning should conserve energy and reduce peak load demands, reduce natural resource consumption, minimize environmental impacts, and treat local communities fairly in providing energy efficiency programs and locating energy facilities CO 8.3: Assist in efforts to develop alternative energy technologies that have minimum adverse effect on the environment, and explore and promote newer opportunities for the use of alternative energy sources.	**Consistent**. The project would assist the county in promoting an alternative energy project.
	CO 9.2: The County will work with utilities and generators to maximize the benefits and minimize the impacts associated with siting major energy facilities. It will be the goal of the County to site generation facilities in proximity to end-users in order to minimize net energy use and natural resource consumption, and avoid inappropriately burdening certain communities.	**Consistent**. Development of the project would result in an alternative (solar) source of energy, located outside existing communities that would minimize the use of non-renewable natural resources.
	GOAL D/CO 1. Preserve the unique environmental features and natural resources of the Desert Region, including native wildlife, vegetation, water and scenic vistas. POLICIES	**Inconsisten**t. The proposed project would intrude into scenic vistas in the Clark Mountains and would require removal of approximately 4 square miles of vegetation.
	D/CO 1.2 Require future land development practices to be compatible with the existing topography and scenic vistas, and protect the natural vegetation.	**Inconsistent.** The project would not be compatible with existing scenic vistas, and would not substantially protect the natural vegetation.
	OS 5.1 Features meeting the following criteria will be considered for designation as scenic resources: a. A roadway, vista point, or area that provides a vista of undisturbed natural areas. b. Includes a unique or unusual feature that comprises an important or dominant portion of the viewshed (the area within the field of view of the observer). c. Offers a distant vista that provides relief from less attractive views of nearby features (such as views of mountain backdrops from urban areas).	**Inconsistent**. The project would not maintain or enhance the visual character of the views on I-15 within its viewshed.

	OS 5.2 Define the scenic corridor on either side of the designated route, measured from the outside edge of the right-of-way, trail, or path. Development along scenic corridors will be required to demonstrate through visual analysis that proposed improvements are compatible with the scenic qualities present. OS 5.3 The County desires to retain the scenic character of visually important roadways throughout the County. A "scenic route" is a roadway that has scenic vistas and other scenic and aesthetic qualities that over time have been found to add beauty to the County. Therefore, the County designates the following routes as scenic highways and applies all applicable policies to development on these routes (see Figures 2-4A through 2-4C of the Circulation and Infrastructure Background Report): OS 5.3 The County desires to retain the scenic character of visually important roadways throughout the County. A "scenic route" is a roadway that has scenic vistas and other scenic and aesthetic qualities that over time have been found to add beauty to the County. Therefore, the County designates the following routes as scenic highways and applies all applicable policies to development on these routes (see Figures 2-4A through 2-4C of the Circulation and Infrastructure Background Report): (MULTIPLE REGIONS): c. *Interstate 15 from the junction with Interstate 215 northeast to the Nevada state line*, excepting those areas within the Barstow Planning Area and the community of Baker where there is commercial /industrial development; those portions within the Yermo area from Ghost Town Road to the East Yermo Road overcrossing on the south side only and from First Street to the East Yermo Road overcrossing on the north side; and all incorporated areas.	**Inconsistent.** Visual analysis of the project concluded that the proposed project would not retain the existing scenic qualities of the viewshed.

NOISE AND VIBRATION

Applicable LORS	*Description*
Federal (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure
State (Cal/OSHA): Cal. Code Regs., tit. 8, §§ 5095–5099	Protects workers from the effects of occupational noise exposure
Local San Bernardino County General Plan Noise Element	Establishes noise limits as specified in the Development Code (below)
San Bernardino County Development Code, Ch. 83.01	Establishes property line noise limits for various receiving uses. Exempts construction noise during certain hours. Establishes vibration limits.

PUBLIC HEALTH AND SAFETY

Applicable LORS	*Description*
Federal	
Clean Air Act section 112 (Title 42, U.S. Code section 7412)	This act requires new sources that emit more than 10 tons per year of any specified Hazardous Air Pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology.
State	
California Health and Safety Code section 25249.5 et seq. (Proposition 65)	These sections establish thresholds of exposure to carcinogenic substances above which Prop 65 exposure warnings are required.
California Health and Safety Code section 41700	This section states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Public Resource Code section 25523(a); Title 20 California Code of Regulations (CCR) section 1752.5, 2300–2309 and Division 2 Chapter 5, Article 1, Appendix B, Part (1); California Clean Air Act, Health and Safety Code section 39650, et seq.	These regulations require a quantitative health risk assessment for new or modified sources, including power plants that emit one or more toxic air contaminants (TACs).
Local	
Mojave Desert Air Quality Management District Regulation XIII Rule 1320	This rule requires a review of new or modified projects that emit toxic air contaminants and the preparation of a health risk assessment. A permit would not be issued if the risk were greater than 10 in 1 million or if the hazard index were greater than 1.0. It also requires the use of best available control of toxics.

RECREATION

Applicable LORS	*Description*
Federal	
Federal Land Policy and Management Act (FLPMA)	Recognizes that it is the policy of the United States that the public lands be managed in a manner which will provide for outdoor recreation.
California Desert Conservation Area (CDCA) Plan	Defines Multiple-Use Classes for BLM-managed lands in the CDCA, which includes the land area encompassing the proposed project location.
Northern and Eastern Mojave Desert Management Plan (NEMO) Amendment	The purpose of this amendment to the CDCA Plan was to evaluate land use changes necessary to protect threatened and endangered species. This included changes in permitted recreational uses and designated routes of travel.
State	
Warren-Alquist Act	§25529 requires that when a facility is proposed to be located in the coastal zone or any other area with recreational, scenic, or historic value, the commission will require, as a condition of certification that an area be established for public use.

POWER PLANT EFFICIENCY

No federal, state, local, or county laws, ordinances, regulations and standards (LORS) apply to the efficiency of this project.

POWER PLANT RELIABILITY

No federal, state, local, or county laws, ordinances, regulations and standards (LORS) pertain to the reliability of this project.

SOCIOECONOMICS and ENVIRONMENTAL JUSTICE

Applicable LORS	*Description*
Federal	
Executive Order 12898 (*Federal Register*, Vol. 59, No. 32, February 11, 1994)	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. The order requires the U.S. 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.
National Environmental Policy Act (NEPA) 42 United States Code (USC) 4321 et seq.	Under NEPA, an environmental impact statement must discuss social and economic effects if they are related to the natural or physical effects and the definition of "effects" includes economic and social factors. Consequently, a federal environmental document must include an analysis of the proposed project's economic, social, and demographic effects related to effects on the natural or physical environment in the affected area, but does not allow for economic, social, and demographic effects to be analyzed in isolation from the physical environment.
State	
California Environmental Quality Act (CEQA) Title 14 of the California Code of Regulations, Chapter 3, Guidelines for Implementation of the California Environmental Quality Act, Article 9(a), section 15131	Socioeconomic impacts are limited to those that could be considered direct effects on the environment, such as changes to population and housing, and that are separate from strictly economic impacts, such as a loss of revenue.
California Education Code, Section 17620	The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.
California Government Code, Section 65040.12(e);	Environmental justice is defined as "the fair treatment of people of all races, cultures, and

Applicable LORS	*Description*
Pubic Resources Code, Section 71116(j).)	incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."
California Government Code, sections 65996–65997	These sections include provisions for school district levies against development projects. As amended by Senate Bill 50 (Greene, Chapter 407, section 23, Statutes of 1998), these sections state that, except for fees established under Education Code 17620, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost of school facilities.
California Revenue and Taxation Code, sections 721–725: California Board of Equalization (BOE) – Property Tax Rule 905 (BOE authority to assess electrical generating facilities is found in Article XIII, section 19, of California's Constitution)	Property Tax Rule 905 states "the Board shall annually assess every electric generation facility with generating capacity of 50 MW or more..." It also states that for purposes of this rule, "electric generation facility" does not include a qualifying small power production facility or qualifying cogeneration facility within the meaning of section 201 and section 210 of Title II of the Public Utility Regulatory Policies Act of 1978. According to this act, (16 USC, section 796 [17] [A]), a "small power production facility is defined as 'A facility which is eligible solar, wind, waste, or geothermal facility...[that] has a power production capacity, which together with any other facilities located at the same site, is not greater than 80 MW.'"
Local	
San Bernardino County General Plan	San Bernardino County General Plan's (2007) Economic Development Element calls for a vibrant and thriving local economy that spans a variety of industries, services, and other sectors while recognizing the distinctions between the growth stages of the Valley, Mountain, and Desert Planning Regions in encouraging industrial, office, and professional development and local-serving employment. The Economic Development Background report (2005) states that the Desert Planning Region (which includes the proposed ISEGS site) is just entering Stage 2 of the three-stage pattern of development. Stage 2 is where an area is capable of attracting blue collar and entry-level white collar workers and companies that take advantage of undeveloped industrial space.

SOIL & WATER RESOURCES

Applicable LORS	*Description*
Federal	
Clean Water Act (33 U.S.C. Section 1257 et seq.)	The Clean Water Act (CWA) (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of storm water and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act of 1967. The CWA also establishes protection of navigable waters through Section 401. Section 401 certification through the Army Corps of Engineers and Regional Water Quality Control Board (RWQCB) is required if there are potential impacts to surface waters of the State and/or Waters of the United States, such as perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands. The Army Corps and RWQCB can require impacts to these waters to be quantified and mitigated.
Resource Conservation and Recovery Act, 40 CFR Part 260 et seq.	The Resource Conservation Recovery Act (RCRA) is a comprehensive body of regulations that give U.S. EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of non-hazardous solid wastes.
State	
California Constitution, Article X, Section 2	This section requires that the water resources of the State be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited.
The Porter-Cologne Water Quality Control Act of 1967, Water Code Sec 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable. Section 13000 also states that the State must be prepared to exercise its full power and jurisdiction to protect the quality of the waters of the State from degradation.
California Water Code Section 13050	Defines “waters of the State.”
California Water Code Section 13240, 13241, 13242, 13243, & Water Quality Control Plan for the Lahontan Region (Basin Plan)	The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provides comprehensive water quality planning. The following chapters are applicable to determining appropriate control measures and cleanup levels to protect beneficial uses and to meet the water quality objectives: Chapter 2, Present and Potential Beneficial Uses; Chapter 3, Water Quality Objectives, and the sections of Chapter 4, Implementation, entitled “Requirements for Site Investigation and Remediation,” “Cleanup Levels,” “Risk

	Assessment," "Stormwater Problems and Control Measures," Erosion and Sedimentation," "Solid and Liquid Waste Disposal to Land," and "Groundwater Protection and Management."
California Water Code Section 13260	Requires filing, with the appropriate RWQCB, a report of waste discharge that could affect the water quality of the state unless the requirement is waived pursuant to Water Code section 13269.
California Code of Regulations, Title 23, Division 3, Chapter 30	This chapter requires the submission of analytical test results and other monitoring information electronically over the internet to the SWRCB's Geotracker database.
State Water Resources Control Board General Permit CAS000002.	The SWRCB regulates storm water discharges associated with construction projects affecting areas greater than or equal to 1 acre to protect state waters. Under General Permit CAS000002, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity. Projects can qualify under this permit if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent.
State Water Resources Control Board 2003-003-DWQ	This general permit applies to the discharge of water to land that has a low threat to water quality. Categories of low threat discharges include piping hydrostatic test water.
California Code of Regulations, Title 22	Title 22, Division 4, Chapter 15 specifies Primary and Secondary Drinking Water Standards in terms of Maximum Contaminant Levels (MCLs). These MCLs include total dissolved solids (TDS) ranging from a recommended level of 500 milligrams per liter (mg/l), an upper level of 1,000 mg/l and a short term level of 1,500 mg/l. Other water quality MCLs are also specified, in addition to MCLS specified for heavy metals and chemical compounds.
California Code of Regulations, Title 23	Title 23, Division 3, Chapter 15 applies to waste discharges to land and requires the Regional Board issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
Local	
County of San Bernardino General Plan and Development Code	Grading in San Bernardino County is subject to terms and conditions of San Bernardino County's General Plan, Development Code and California Building Code, based upon the 2006 International Building Code. Although the proposed site is located on federal land, county regulations for public health and safety are considered to be applicable to the project. If a county grading permit is required, the grading plan would need to be completed in compliance with San Bernardino County's General Plan and Development Code.
California Safe Drinking Water Act and San Bernardino County Code Title 3, Division 3, Chapter 6, Public Water	Requires public water systems to obtain a Domestic Water Supply Permit. The California Safe Drinking Water Act requires public water systems to obtain a Domestic Water Supply Permit. Public water systems are defined as a system for the provision of water for human consumption through pipes or other constructed

Supply Systems	conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out the year. California Department of Public Health (CDPH) administers the Domestic Water Supply Permit program, and has delegated issuance of Domestic Water Supply Permits for smaller public water systems in San Bernardino County to the County. Under the San Bernardino County Code Title 3, 5.15-6 Division 3, Chapter 6, Public Water Supply Systems, the County Department of Environmental Services monitors and enforces all applicable laws and orders for public water systems with less than 200 service connections. The proposed project would likely be considered a non-transient, non-community water system.
San Bernardino County Title 3, Division 3, Chapter 6,Article 5, Desert Groundwater Management	To help protect water resources in unregulated portions of the desert while not precluding its use, the County adopted this article. This article requires a permit to locate, construct, operate, or maintain a new groundwater well within the unincorporated, unadjudicated desert region of San Bernardino County. California Environmental Quality Act (CEQA) compliance must be completed prior to issuance of a permit, and groundwater management, mitigation, and monitoring may be required as a condition of the permit. The ordinance states that it does not apply to "groundwater wells located on Federal lands unless otherwise specified by inter-agency agreement." The BLM and County entered into a Memorandum of understanding (MOU) that provides that the BLM will require conformance with this code for all projects proposing to use groundwater from beneath public lands.
San Bernardino County Development Code Section 82.13.080, Soil Erosion and Sediment Control Plans/Permits	Section 82.13.080 establishes regulations and procedures to control human existing and potential induced accelerated erosion. Elements of this ordinance include project planning, preparation of Soil Erosion and Sediment Control Plans, runoff control, land clearing, and winter operations.
San Bernardino County Ordinance Code, Title 3, Division 3, Chapter 8, Waste Management, Article 5, Liquid Waste Disposal	This ordinance requires the following compliance for all liquid waste disposal systems: (1) compliance with applicable portions of the Uniform Plumbing Code and the San Bernardino County Department of Environmental Health (DEHS) standards; (2) approval by the DEHS and building authority with jurisdiction over the system; or (3) for alternative systems, approval by the DEHS, the appropriate building official of this jurisdiction, and the appropriate California RWQCB.
San Bernardino County Ordinance Code, Title 6, Division 3, Chapter 3, Uniform Plumbing Code	This ordinance describes the installation and inspection requirements for locating disposal/leach fields and seepage pits.
State Policies and Guidance	
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq.)	In the 2003 Integrated Energy Policy Report (IEPR), consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they will approve the use of fresh water for cooling purposes by power plants only where alternative water supply sources and alternative cooling

	technologies are shown to be “environmentally undesirable” or “economically unsound.”
State Water Resources Control Board Res. No. 68-16	The “Antidegradation Policy” mandates that: 1) existing high quality waters of the State are maintained until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonable affect present and anticipated beneficial uses, and will not result in waste quality less than adopted policies; and 2) requires that any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters, must meet WDRs which will result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance will not occur and b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.
State Water Resources Control Board Res. 75-58	The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound.
State Water Resources Control Board Res. No. 88-63	States that all groundwater and surface water of the State are considered to be suitable for municipal or domestic water supply with the exception of those waters that meet specified conditions.
State Water Resources Control Board Res. 2005-0006	Adopts the concept of sustainability as a core value for State Water Board programs and directs its incorporation in all future policies, guidelines, and regulatory actions.
State Water Resources Control Board Res. 2008-0030	Requires sustainable water resources management such as low impact development (LID) and climate change considerations, in all future policies, guidelines, and regulatory actions. Directs Regional Water Boards to “aggressively promote measures such as recycled water, conservation and LID Best Management Practices where appropriate and work with Dischargers to ensure proposed compliance documents include appropriate, sustainable water management strategies.”
The California Safe Drinking Water and Toxic Enforcement Act	The California Health & Safety Code Section 25249.5 et seq. prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The RWQCB administers the requirements of the Act.

TRAFFIC AND TRANSPORTATION

Applicable LORS	*Description*
Federal	
Code of Federal Regulations (CFR), Title 14 Aeronautics and Space, Part 77 Objects Affecting Navigable Airspace (14 CFR 77)	This regulation establishes standards for determining physical obstructions to navigable airspace; sets noticing and hearing requirements; and provides for aeronautical studies to determine the effect of physical obstructions to the safe and efficient use of airspace.
CFR, Title 49, Subtitle B	49 CFR Subtitle B includes procedures and regulations pertaining to interstate and intrastate transport (including hazardous materials program procedures) and provides safety measures for motor carriers and motor vehicles that operate on public highways.
State	
California Vehicle Code (CVC), Division 2, Chapter 2.5; Div. 6; Chap. 7; Div. 13; Chap. 5; Div. 14.1; Chap. 1 & 2; Div. 14.8; Div. 15	This code includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.
California Streets and Highway Code, Division 1, Chapter 3; Division 2 Chapter 5.5	This code includes regulations for the care and protection of state and county highways and provisions for the issuance of written permits.
Local	
SANBAG Regional Transportation Plan	Identifies public policies and strategies for the transportation system in the San Bernardino County region.
SANBAG Congestion Management Plan (CMP)	Requires maintenance of level of service (LOS) E or better on CMP segments.
San Bernardino County General Plan	Establishes regional transportation objectives, policies, and implementation measures for various modes of transportation.
San Bernardino County Code, Title 5, Division 1, Highway Permit	Addresses permitting requirements for oversize/overweight vehicles.

TRANSMISSION LINE SAFETY AND NUISANCE

Applicable LORS	*Description*
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations (CFR),"Objects Affecting the Navigable Air Space"	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, "Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA in cases of potential for an obstruction hazard.
FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines to prevent or mitigate interference.
Audible Noise	
Local	
San Bernardino County General Plan, Noise Element	**References the county's Ordinance Code for noise limits.**
San Bernardino County Development Code	**Establishes performance standards for planned residential or other noise-sensitive land uses.**
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
Title 8, California Code of Regulations (CCR) section 2700 et seq. "High Voltage Safety Orders"	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.

Applicable LORS	*Description*
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC "Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California"	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR sections 1250-1258, "Fire Prevention Standards for Electric Utilities"	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

TRANSMISSION SYSTEM ENGINEERING

Applicable LORS	*Description*
NERC/WECC (North American Electric Reliability Corporation/Western Electricity Coordinating Council)	The combined planning standards provide system performance standards for assessing the reliability of the interconnected transmission system. These standards require continuity of service as their first priority and the preservation of interconnected operation as their second. Some aspects of NERC/WECC standards are either more stringent or more specific than the either agency's standards alone. These standards are designed to ensure that transmission systems can withstand both forced and maintenance outage system contingencies while operating reliably within equipment and electric system thermal, voltage, and stability limits. These standards include reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of WECC standards, *NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table,* and on Section I.D, *NERC and WECC Standards for Voltage Support and Reactive Power.* These standards require that power flows and stability simulations verify defined performance levels. Performance levels are defined by specifying allowable variations in thermal loading, voltage and frequency, and loss of load that may occur during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (such as the loss of load from a single transmission element) to a catastrophic loss level designed to prevent system cascading and the subsequent blackout of islanded areas and millions of consumers during a major transmission disturbance (such as the loss of multiple 500-kV lines along a common right-of- way, and/or of multiple large generators). While the controlled loss of generation or system separation is permitted under certain specific circumstances, this sort of major uncontrolled loss is not permitted (WECC, 2002). NERC's reliability standards for North America's electric transmission system spell out the national policies, standards, principles, and guidelines that ensure the adequacy and security of the nation's transmission

	system. These reliability standards provide for system performance levels under both normal and contingency conditions. While these standards are similar to the combined NERC/WECC standards, certain aspects of the combined standards are either more stringent or more specific than the NERC performance standards alone. NERC's reliability standards apply to both interconnected system operations and to individual service areas (NERC, 2006).
California Public Utilities Commission (CPUC) General Order 95 (GO-95*), Rules for Overhead Electric Line Construction*	Specifies uniform requirements for the construction of overhead electric lines. Compliance with this order ensures both reliable service and a safe working environment for those working in the construction, maintenance, operation, or use of overhead electric lines, and for the safety of the general public.
CPUC General Order 128 (GO-128), *Rules for Underground Electric Line Construction*	Establishes uniform requirements for the construction of underground electric lines. Compliance with this order also ensures both reliable service and a safe working environment for those working in the construction, maintenance, operation, or use of underground electric lines, and for the safety of the general public.
National Electric Safety Code 1999	Provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.
California Independent System Operator (CAISO)	California ISO Planning Standards also provide standards, and guidelines to assure the adequacy, security and reliability in the planning of the California ISO transmission grid facilities. The California ISO Grid Planning Standards incorporate the NERC/WECC and NERC Reliability Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar to the NERC/WECC or NERC Reliability Planning Standards for Transmission System Contingency Performance. However, the California ISO Standards also provide some additional requirements that are not found in the WECC/NERC or NERC Standards. The California ISO

	Standards apply to all participating transmission owners interconnecting to the California ISO controlled grid. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the California ISO (California ISO 2002a).
California ISO/FERC Electric Tariff	Provides guidelines for construction of all transmission additions/upgrades (projects) within the California ISO controlled grid. The California ISO determines the “Need” for the proposed project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the Cost Responsibility of the proposed project and provides an Operational Review of all facilities that are to be connected to the California ISO grid (California ISO 2007a). California ISO/FERC (Federal Energy Regulatory Commission) electricity tariffs contain guidelines for building all transmission additions/upgrades within the California ISO-controlled grid. (California ISO, 2003a).

VISUAL RESOURCES

Applicable LORS	*Description*
Federal	
National Environmental Policy Act (NEPA)	Under the National Environmental Policy Act (NEPA), it is the responsibility of the federal government to "use all practicable means to ensure all Americans safe, healthful, productive and aesthetically and culturally pleasing surroundings (42 USC 4331(b)2). "
Federal Land Policy and Management Act of 1976 (FLPMA)	FLPMA is the enabling legislation establishing the Bureau of Land Management's responsibilities for lands under its jurisdiction. Section 102 (a) of the FLPMA states that " . . . . the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values …. " Section 103 (c) identifies "scenic values" as one of the resources for which public land should be managed. Section 201 (a) states that "The Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including ... scenic values) ...." Section 505 (a) requires that "Each right-of-way shall contain terms and conditions which will... minimize damage to the scenic and esthetic (sic) values...."
California Desert Conservation Area (CDCA) Plan	The ISEGS project is located within the California Desert Conservation Area Plan, which is the BLM Resource Management Plan applicable to the project site (USDOI, 1980, as amended). The CDCA Plan did not include Visual Resource Management (VRM) inventory or management classes. However, BLM developed updated Visual Resource Inventory

	(VRI) mapping in 2008 (USDOI, 2008). The ISEGS site is classified in the CDCA Plan as Multiple-Use Class (MUC) L (Limited Use). Multiple-Use Class L, the most restrictive under the plan, "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." The CDCA Plan includes a table (Table 1) which illustrates the types of allowable land uses by MUC Class. The table specifically includes Electrical Power Generation Facilities including Wind/Solar facilities. Guidance provided under this section allows for the authorization of such facilities within MUC Class L lands in compliance with NEPA requirements.
Northern and Eastern Mojave CDCA Plan Amendments (NEMO), 2002	The NEMO plan amendments to the CDCA Plan did not directly affect visual resource management. Among the elements of the NEMO plan amendments was designation of approved motorized vehicle trails, including several such trails within the ISEGS site. According to the NEMO Routes Designation EA, "the off-road vehicle experience of traveling historic routes provides an educational and scenic experience of the natural wonders of a harsh desert region and the elements that the pioneers and founders of the historical route had to endure." (USDOI, 2004). The East Mojave Heritage Trail, a 650-mile trail identified in the NEMO Proposed Route Designation Plan Amendment as a major historical trail of scenic, historic, and Native American values, is one such designated trail within the Ivanpah Valley. However, it does not cross the ISEGS site and would not be affected by the project (Murray, Tel. Con. 9/23/08).).

National Historic Preservation Act (NHPA)	Under regulations of the NHPA, visual impacts to a listed or eligible National Register property that may diminish the integrity of the property's " . . . setting . . .(or) feeling . . . " in a way that affects the property's eligibility for listing, may result in a substantial adverse effect. "Examples of adverse effects . . . include . . . Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features . . . . " (36 CFR Part 800.5)
State	
State Scenic Highway Program	The California State Department of Transportation (Caltrans) identifies a state system of eligible and designated scenic highways which, if designated, are subject to various controls intended to preserve their scenic quality (Ca. Streets and Highways Code, Sections 260 through 263). Highway I-15 within the project viewshed is not listed as an eligible State Scenic Highway.
Local	
County of San Bernardino General Plan	Various policies of the Conservation and Open Space Elements of the San Bernardino County General Plan refer to the protection of scenic resources in the project area, as described in detail in Visual Resources Table 3. In particular, Open Space Policies 5.1 through 5.3 provide protection to designated County scenic routes. Highway I-15 in the Ivanpah Valley is a designated County scenic route.
Night Sky Protection Ordinance Ord. 3900 (San Bernardino County Code 87.0921)	Ordinance intended "to encourage effective, non-detrimental lighting; to maintain night-time safety, utility, security and productivity; and to encourage lighting practices and systems which will minimize light pollution, glare and light trespass, conserve energy and resources and curtail the degradation of the night time visual environment . . . . "

WASTE MANAGEMENT

Applicable LORS	*Description*
Federal	
Title 42, United States Code, §§ 6901, et seq. Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.)	The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) et al., establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation, and delegation to states, enforcement provisions, and responsibilities, as well as research, training, and grant funding provisions. RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills.
Title 40, Code of Federal Regulations (CFR), Subchapter I – Solid Wastes	These regulations were established by U.S. EPA to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes. U.S. EPA implements the regulations at the federal level. However, California is an authorized state so the regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA.
Title 49, CFR, Parts 172 and 173 Hazardous Materials Regulations	U.S. Department of Transportation established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, Section 262.20.
State	
California Health and Safety Code, Chapter 6.5, §§ 25100, et seq. Hazardous Waste Control Act of 1972, as amended	This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements. The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program

Applicable LORS	***Description***
	Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (CCR), Division 4.5 Environmental Health Standards for the Management of Hazardous Waste	These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes. Hazardous waste generators must obtain identification numbers, prepare manifests before transporting the waste off site, and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters. The Title 22 regulations are established and enforced at the state level by DTSC. Some generator standards are also enforced at the local level by CUPAs.
California Health and Safety Code, Chapter 6.11 §§ 25404–25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below. • Aboveground Storage Tank Program • Business Plan Program • California Accidental Release Prevention (CalARP) Program • Hazardous Materials Management Plan / Hazardous Materials Inventory Statement Program • Hazardous Waste Generator / Tiered Permitting Program • Underground Storage Tank Program The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as Certified Unified Program Agencies (CUPAs). San Diego County Department of Environmental Health is the area CUPA.
Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §§ 15100, et seq. Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400–15410). • Article 10 – Business Reporting to CUPAs (§§ 15600–15620).

Applicable LORS	*Description*
Public Resources Code, Division 30, §§ 40000, et seq. California Integrated Waste Management Act of 1989.	The California Integrated Waste Management Act of 1989 (as amended) establishes mandates and standards for management of solid waste. Among other things, the law includes provisions addressing solid waste source reduction and recycling, standards for design and construction of municipal landfills, and programs for county waste management plans and local implementation of solid waste requirements.
California Health and Safety Code, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989 (also known as SB 14).	This law was enacted to expand the state's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (~ 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a 4-year cycle, with a summary progress report due to DTSC every 4th year.
Title 22, CCR, § 67100.1 et seq. Hazardous Waste Source Reduction and Management Review.	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the act.
California Fire Code	Controls storage of hazardous materials and wastes and the use and storage of flammable/combustible liquids. Waste will be accumulated and stored in accordance with Fire Code requirements. Permits for storage containers will be obtained, as needed, from the San Bernardino County Fire Department.
Local	
San Bernardino County, Countywide Integrated Waste Management Plan	This document sets forth the county's goals, policies, and programs for reducing dependence on landfill solid wastes and increasing source reduction, recycling, and reuse of products and waste, in compliance with the CIWMA. The plan also addresses the siting and development of recycling and disposal facilities and programs within the county.

WORKER SAFETY AND FIRE PROTECTION

Applicable LORS	*Description*
Federal	
29 U.S. Code sections 651 et seq (Occupational Safety and Health Act of 1970)	This Act mandates safety requirements in the workplace, with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
29 CFR sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide federal approval of California's plan for enforcement of its own safety and health requirements, in lieu of most of the federal requirements found in 29 CFR §1910.1 to 1910.1500.
State	
8 CCR all applicable sections (Cal/OSHA regulations)	Requires that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during the construction, commissioning, and operation of power plants, as well as safety around electrical components, fire safety, and hazardous materials usage, storage, and handling.
24 CCR section 3, et seq.	Incorporates the current edition of the International Building Code.
Health and Safety Code sections 25500 to 25541	Requires a Hazardous Materials Business plan detailing emergency response plans for hazardous materials emergencies at a facility.
Local (or locally enforced)	
	San Bernardino County does not have additional LORS that apply to Hazardous Materials Handling, but administers the State of California programs as the CUPA.
2007 Edition of California Fire Code and all	NFPA standards are incorporated into the California State Fire Code. The fire code contains general provisions for fire safety, including road and building access, water supplies, fire

applicable NFPA standards (24 CCR Part 9)	protection and life safety systems, fire-resistive construction, storage of combustible materials, exits and emergency escapes, and fire alarm systems.
Title 24, California Code of Regulations (24 CCR § 3, et seq.)	The California Building Code is comprised of 11 parts containing building design and construction requirements as they relate to fire, life, and structural safety. It incorporates current editions of the International Building Code, including the electrical, mechanical, energy, and fire codes applicable to the project.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

DOCKET NO. 07-AFC-5

FINAL EXHIBIT LIST

APPLICANT'S EXHIBITS

EXHIBIT 1 Application for Certification, Volume I and II; dated 8/28/2007, docketed on 8/31/2007. Sponsored by Applicant, and admitted into evidence on 1/11/2010.

EXHIBIT 2 Data Adequacy Supplement A; dated 10/5/2007, docketed on 10/5/2007. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 3 Data Adequacy Supplement B; dated 10/19/2007, docketed on 10/19/2007. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 4 Data Response, Set 1A; dated 1/14/2008, docketed on 1/14/2008. Sponsored by Applicant, and admitted into evidence on 1/11/2010.

EXHIBIT 5 Data Response, Set 1B; dated 2/11/2008, docketed on 2/11/2008. Sponsored by Applicant, and admitted into evidence on 1/11/2010.

EXHIBIT 6 Data Response, Set 1C; dated 3/10/2008, docketed 3/10/2008. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 7 Data Response, Set 1D (Optimization); dated 5/9/2008, docketed 5/9/2008. Sponsored by Applicant, and admitted into evidence on 1/11/2010.

EXHIBIT 8 Data Response, Set 1E; dated 7/22/2008, docketed 7/22/2008. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 9	Data Response, Set 1F; dated 8/6/2008, docketed 8/7/2008. Sponsored by Applicant, and admitted into evidence on 1/14/2010.
EXHIBIT 10	Data Response, Set 1G; dated 9/10/2008, docketed 9/10/2008. Sponsored by Applicant, and admitted into evidence on 1/14/2010.
EXHIBIT 11	Data Response, Set 1H; dated 9/12/2008, docketed 9/15/2008. Sponsored by Applicant, and admitted into evidence on 1/14/2010.
EXHIBIT 12	Data Response, Set 1I; dated 10/24/2008, docketed 9/1/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.
EXHIBIT 13	Data Response, Set 1J; dated 12/8/2008, docketed 12/8/2008. Sponsored by Applicant, and admitted into evidence on 1/13/2010.
EXHIBIT 14	Data Response, Set 1K; dated 5/27/2009, docketed 5/27/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.
EXHIBIT 15	Data Response, Set 1L; dated 6/2/2009, docketed 6/2/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.
EXHIBIT 16	Data Response, Set 1M; dated 6/3/2009, docketed 6/3/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.
EXHIBIT 17	Data Response, Set 1N; dated 8/5/2009, docketed 8/6/2009. Sponsored by Applicant, and admitted into evidence on 1/13/2010.
EXHIBIT 18	Data Response, Set 1O; dated 8/13/2009, docketed 8/13/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.
EXHIBIT 19	Data Response, Set 1P; dated 9/9/2009, docketed 9/9/2009. Sponsored by Applicant, and admitted into evidence on 1/13/2010.
EXHIBIT 20	Data Response 2A; dated 6/10/2008, docketed 6/10/2008. Sponsored by Applicant, and admitted into evidence on 1/11/2010.
EXHIBIT 21	Data Response, Set 2B; dated 7/22/2008, docketed 7/22/2008. Sponsored by Applicant, and admitted into evidence on 1/11/2010.
EXHIBIT 22	Data Response, Set 2C; dated 8/6/2008, docketed 8/6/2008. Sponsored by Applicant, and admitted into evidence on 1/13/2010.
EXHIBIT 23	Data Response, Set 2D; dated 9/12/2008, docketed 9/15/2008. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 24 Data Response 2E; dated 9/19/2008, docketed 9/19/2008. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 25 Data Response, Set 2F; dated 10/2/2008; docketed 10/3/2008. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 26 Data Response, Set 2G; dated 1/28/2009, docketed 1/28/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 27 Data Response, Set 2H; dated 5/13/2009, docketed 5/14/2009. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 28 Data Response, Set 2I; dated 5/18/2009, docketed 5/18/2009. Sponsored by Applicant, and admitted into evidence on 1/11/2010.

EXHIBIT 29 Data Response, Set 2J; dated 6/17/2009; docketed 6/17/2009. Sponsored by Applicant, and admitted into evidence on 1/11/2010.

EXHIBIT 30 Data Response, Set 2K; dated 6/30/2009, docketed 6/30/2009. Sponsored by Applicant, and admitted into evidence on 1/11/2010.

EXHIBIT 31 Data Response, Set 2KR; dated 9/10/2009, docketed 9/10/2009. Sponsored by Applicant, and admitted into evidence on 1/11/2010.

EXHIBIT 32 Supplemental Data Response, Set 1A; dated 8/12/2008, docketed on 8/12/2008. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 33 Supplemental Data Response; Set 1B; dated 8/22/2008, docketed 8/22/2008. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 34 Supplemental Data Response; Set 1C; dated 9/12/2008, docketed 9/12/2008. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 35 Supplemental Data Response; Set 1D, dated 9/24/2008, docketed 9/24/2008. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 36 Supplemental Data Response, Set 1E; dated 11/21/2008, docketed 11/21/2008. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 37 Supplemental Data Response, Set 1F; dated 12/8/2008, docketed 12/8/2008. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 38 Supplemental Data Response, Set 2A; dated 3/19/2009, docketed 3/20/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 39 Supplemental Data Response, Set 2B; dated 5/13/2009, docketed 5/14/2009. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 40 Supplemental Data Response, Set 2C; dated 5/19/2009, docketed 5/19/2009. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 41 Supplemental Data Response, Set 2D; dated 5/19/2009docketed 5/27/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 42 Supplemental Data Response, Set 2E; dated 6/3/2009, docketed 6/3/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 43 Supplemental Data Response, Set 2F; dated 6/5/2009, docketed 6/5/2009. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 44 Supplemental Data Response, Set 2G; dated 6/9/2009, docketed 6/9/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 45 Supplemental Data Response, Set 2H; dated 6/9/2009, docketed 6/9/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 46 Supplemental Data Response, Set 2I; dated 8/10/2009, docketed 8/10/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 47 Supplemental Data Response, Set 2J; dated 8/12/2009, docketed 8/12/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 48 Supplemental Data Response, Set 3A; dated 7/23/2009, docketed 7/23/209. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 49 Supplemental Data Response, Set 4; dated 8/20/2009, docketed 8/20/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 50 Air Dispersion Modeling Protocol; dated 6/18/2007, Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 51 Cumulative Impacts Analysis; dated 8/20/2007, Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 52 Letter dated August 23, 2007 from Mojave Desert Air Quality Management District (Alan De Salvio) to Sierra Research (Steve Hill) describing stationary sources within 6 miles of the Project, dated 8/23/2007, Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 53 Application for Authority to Construct; dated 9/18/2007, Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 54 DPT 2 System Impact Study Report **(CONFIDENTIAL-DOC NOT INCLUDED IN FILES**); dated 8/28/2008, docketed 9/29/2008. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 55 Comments on PDOC for Ivanpah SEGS Project; dated 11/3/2008, Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 56 Final Decision / Determination of Compliance; dated 12/3/2008, docketed12/5/2008. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 57 PSA Comments, Set 1; dated 1/23/2009, docketed 1/23/2009. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 58 Preliminary Decision / Determination Ivanpah Solar Electric Generating System; dated 2/15/2008, docketed 2/25/2008. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 59 Revisions to the FDOC for Ivanpah SEGS Project; dated 3/31/2009, Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 60 MDAQMD's FDOC for ISEGS; dated 4/9/2009, docketed 4/20/2009. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 61 Revisions to the FDOC for Ivanpah SEGS Project; dated 6/24/2009, Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 62 Ivanpah Final Determination Rev B; dated 7/15/2009, docketed 7/27/2009. Sponsored by Applicant, and admitted into evidence on 1/13/2010.

EXHIBIT 63 Letter to John Kessler from the Applicant regarding Applicant's Biological Resources Mitigation; dated 8/7/2009, docketed 8/10/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 64 Duration of ISEGS Grading; dated 8/12/2009, docketed 8/18/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 65 Applicant's Testimony; dated 11/16/2009, docketed _____. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 66 Interconnection System Impact Study-Final Report (CONFIDENTIAL-DOC NOT INCLUDED IN FILES); dated 11/24/2008, docketed _____. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 67 Errata to Applicant's Visual Resource Testimony; dated 12/9/2009, docketed 12/9/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 68 Draft EIS for the proposed DesertXpress High-Speed Passenger Train, Chapter 3.16 Cumulative Impacts; March 2009. Sponsored by Applicant, and admitted into evidence on 1/11/ 2010.

EXHIBIT 69 11 x 17 Viewshed Map; dated 12/9/2009, docketed 12/9/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 70 Pre-Workshop Comments of GreenVolts, Cleantech America, and Community Environmental Council on the 2008 Market Price Referent; March 6, 2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 71 Re-DEC Working Group Meeting. Potential Challenges to High Penetration of Distributed Renewable Generation; December 9, 2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 72 California Public Utilities Commission. 2008. Annual Report. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 73 Email communication with Susan Sanders Regarding Desert Tortoise Translocation; dated 8/18/2009, docketed 8/24/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 74 (NERC). 2009. Special Report: Accommodating High Levels of Variable Generation; April 2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 75 Pacific Gas and Electric Company's Comments on the Energy Division's 33% RPS Implementation Analysis Preliminary Results; Dated 8/28/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 76 SDG&E Response to Questions on 33% RPS Implementation Analysis Preliminary Results Report. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 77 Schlesinger, W.H., J. Belnap, and G. Marion. 2009. On carbon sequestration in desert ecosystems; dated 2009 *The Authors Journal compilation* © 2009 Blackwell Publishing Ltd. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 78 Southern California Edison Company's (U 338-E) Comments on, and responses to technical questions regarding, The Energy Division's 33% Renewables Portfolio Standard Implementation Analysis Preliminary Results. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 79 (DOE) 2009. High Penetration Solar Deployment Projects; dated 12/24/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 80 Tracking the Sun II: The Installed Cost of Photovoltaics in the U.S. from 1998-2008" ; dated October 2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 81 Draft Ivanpah SEGS Special-Status Plant Avoidance and Protection Plan; dated January 2010. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 82 "The golden eagle in San Diego County, California." Condor 39:49-56. As cited in Digital-Desert.com. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 83 Water Developments and Desert Bighorn Sheep: Implications for Conservation dated 12/30/2009. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 84 Mona Daniels/Outdoor Recreation Planner with BLM Needles Field Office. 2010. Personal communication with Thomas Priestley/CH2M HILL; dated January 4, 2010. Sponsored by Applicant, and admitted into evidence on 1/11/2010.

EXHIBIT 85 Applicant's Rebuttal Testimony; dated January 5, 2010, docketed January 5, 2010. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 86 Corrections to testimony. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 87 Cover letter dated January 29, 2010, explanatory narrative and map showing Scott Cashen survey transects. Sponsored by Applicant, and admitted into evidence on 1/14/2010.

EXHIBIT 88 Biological Mitigation Proposal ("Mitigated Ivanpah 3") dated February 11, 2010. Sponsored by Applicant, and admitted into evidence on 3/22/2010.

EXHIBIT 89 Map: Sierra Club Alternative and Cashen Transects. Sponsored by Applicant, and admitted into evidence on 3/22/2010.

ENERGY COMMISSION STAFF'S EXHIBITS

EXHIBIT 300 Final Staff Assessment for the Ivanpah Power Plant Project, dated October 8, 2009. Sponsored by Staff; and received into evidence on 1/11/2010.

EXHIBIT 301 Staff's description of its visual resources photos Ivanpah Solar Electric Generating System (07-AFC-5), dated December 14, 2009, docketed December 15, 2009. Sponsored by Staff; and received into evidence on 1/14/2010.

EXHIBIT 302 Staff's response to the Applicant's FSA/DEIS comments Ivanpah Solar Electric Generating System (07-AFC-5), dated December 14, 2009, docketed December 15, 2009. Sponsored by Staff; and received into evidence on 1/13/2010.

EXHIBIT 303 Staff's Proposed Revisions to Conditions of Certification and Limited FSA/DEIS Text Edits to Soil & Water, dated January 4, 2009. Sponsored by Staff; and received into evidence on 1/13/2010.

EXHIBIT 304 Staff's Supplemental Testimony – Cumulative Analysis of SCE Transmission Upgrades, dated January 4, 2010, docketed January 4, 2010. Sponsored by Staff; and received into evidence on 1/11/2010.

EXHIBIT 305 Staff's Rebuttal Testimony, dated January 4, 2010, docketed January 5, 2010. Sponsored by Staff and received into evidence on 1/13/2010.

EXHIBIT 305a California Department of Fish and Game Incidental Take Permit #2081-2005-046-04 Los Angeles Department of Water and Power Pine Tree Wind Development Project, dated 2006, Sponsored by Staff; and received into evidence on 1/14/2010.

EXHIBIT 305b California Department of Fish and Game Incidental Take Permit #2081-2008-015-06 California State Lands Commission AT&T Fiber Optic Cable Replacement Project, dated 2008, Sponsored by Staff; and received into evidence on 1/14/2010.

EXHIBIT 305c California Department of Fish and Game Incidental Take Permit #2081-2005-028-06 Copper Mountain Community College District Copper Mountain Community College Expansion Site, dated 2006,. Sponsored by Staff; and received into evidence on 1/14/2010.

EXHIBIT 305d California Department of Fish and Game Incidental Take Permit #2081-2009-018-06 Coso Operating Company LLC; Coso Hay Ranch Water Extraction and Delivery System, dated 2009, Sponsored by Staff; and received into evidence on 1/14/2010.

EXHIBIT 305e California Department of Fish and Game Incidental Take Permit #2081-2005-015-04 U.S. Borax, Inc. Life of Mine Project, dated 2005, Sponsored by Staff; and received into evidence on 1/14/2010.

EXHIBIT 305f Memo from USFWS Regional Director H. Dale Hall to Regional Directors, Region 1,2,3,4,5,6, and 7 Manger, California/Nevada Operations Office, re: Recovery Units and Jeopardy Determinations under Section 7 of the Endangered Species Act, dated 3/6/06,. Sponsored by Staff; and received into evidence on 1/14/2010.

EXHIBIT 306 Declarations of James Jewell and Scott Flint, dated December 14, 2009, docketed December 15, 2009. Sponsored by Staff; and received into evidence on 1/13/2010.

EXHIBIT 307 Final Determination of Compliance from Mojave Desert Air Quality Management District, dated January 5, 2009, docketed January 5, 2010. Sponsored by Staff; and received into evidence on 1/13/2010.

EXHIBIT 308 Revision to Cumulative Impacts Figure 1 as Referenced by Visual Resources Staff, dated January 5, 2010, docketed January 5, 2010. Sponsored by Staff; and received into evidence on 1/11/2010.

EXHIBIT 309 Energy Commission Staff's Preliminary Staff Assessment, dated December 14, 2009, docketed December 15, 2009. Sponsored by Staff; and received into evidence on 1/14/2010.

EXHIBIT 310 CDFG's Draft Desert Tortoise Mitigation Options, dated January 12, 2010, docketed January 12, 2010. Sponsored by Staff; and received into evidence on 1/14/2010.

EXHIBIT 311 BLM's Biological Assessment, dated January 12, 2010, docketed January 12, 20010. Sponsored by Staff; and received into evidence on 1/14/2010.

EXHIBIT 312 Staff's Proposed Revisions to Conditions of Certification-- Soil & Water and Traffic & Transportation, dated January 12, 2010, docketed January 13, 2010. Sponsored by Staff; and received into evidence on 1/13/2010.

EXHIBIT 313 List of Potential Mitigation parcels (supplied by Scott Flint – CDFG). Sponsored by Staff, DUPLICATIVE OF EXHIBIT 310, NOT RECEIVED INTO EVIDENCE.

EXHIBIT 314 E-mail from Bruce Pavlik dated January 10, 2010, docketed January 11, 2010. Sponsored by Staff, and received AS PUBLIC COMMENT on 1/13/2010.

EXHIBIT 315 Final Staff Assessment Addendum, dated March 2010, docketed 03/16/2010. Sponsored by Staff; and received into evidence on 3/22/2010.

INTERVENOR CURE EXHIBITS

[NONE]

INTERVENOR WESTERN WATERSHEDS PROJECT EXHIBITS

EXHIBIT 500 Letter submitted March 4, 2009 by Western Watersheds Project to John Kessler, Project Manager, Siting, Transmission and environmental Protection Division. California Energy Commission Re: Ivanpah Solar Electric Generating System (ISEGS) (07-AFC-5) Preliminary Staff Assessment; dated March 4, 2009. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 501 Letter submitted May 13, 2009 by Western Watersheds Project RE: Draft Desert Tortoise Translocation Relocation Plan for the Ivanpah Solar Electric Generating System March 2009; dated March 13, 2009. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 502 Berry, K. H., Morafka, D. J. and Murphy, R. W. 2002. Defining the desert tortoise(s): our first priority fora coherent conservation strategy. Chelonian Conservation and Biology 4: 249-262; dated 2002. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 503 U.S. Fish and Wildlife Service. 1994. Figure 9 from: Desert Tortoise (Mojave Population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 73 pages plus appendices (undated). Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 504 U.S. Fish and Wildlife Service. 2009. Range-wide Monitoring of the Mojave Population of the Desert Tortoise: 2007 Annual Report. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada; dated October 2009. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 505 Lamb, T. 1986. Genetic variation in mitochondrial DNA of the Desert Tortoise, Gopherus agassizii, in California. Prace. Desert Tortoise Council Symp. 1986: 45-52; dated copyright 1990 (undated). Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 506 Lamb, *T.,* Avise, J. C. and Gibbons, J. W. 1989. Phylogeographic patterns in mitochondrial DNA of the desert tortoi se *(Xerobates agassizii),* and evolutionary relationships among the North American gopher tortoises. Evolution. 43(1): 76-87; dated 1989. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 507 Murphy, R. W., Berry, K. H., Edwards, T. and Mcluckie, A. M. 2007. A; Genetic Assessment of the Recovery Units for the Mojave Population of the Desert Tortoise, *Gopherus agassiz;;* . Chelonian Conservation and Biology 6(2): 229- 25 1; dated 2007. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 508 CNDDB 2009. Report for Desert Tortoise Occurrence 2. California Natural Diversity Database, California Department of Fish and Game; December 15, 2009. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 509 CNDDB 2009a. Map showing the polygon for Desert Tortoise Occurrence 2. California Natural Diversity Database, California Department of Fish and Game overlaid on a topographic base-map; Dated CND DB 2009. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 510 Britten, H. B., Riddle, B. R., Brossard, P. F., Marlow, R. and Lee, Jr., T. E. 1997. Genetic delineation of management units for the desert tortoise, Gopherus agassizii, in the northeastern Mojave Desert. Copeia 1997: 523-530; dated 1997. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 511 Berry et al., 1984. Plate 6- 13 "Desert Tortoise Crucial Habitat in California Ivanpah Valley" from Berry, K. H. (1984). The Status of the Desert Tortoise (Gopherus agassizii) in the United States. US Fish and Wildlife Services on Purchase Order No. I 1210-0083-81, Page 6-30 (undated). Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 512 Spang, E.F., Lamb, G. W., Rowley, F., Radtkey, W. H., Olendorff, R. R., Dahlem, E. A. and Sloane, S. 1988. Desert Tortoise Habitat Management on the Public Lands: A Rangewide Plan. USDI Bureau of Land Management, November 1988, 23 pp. dated November 1988. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 513 Oftedal, O. T. and Allen, M. E. 1996. Nutrition as a Major Facet of Reptile Conservation. Zoo Biology 15: 491 - 497; dated 1996. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 514 Letter submitted December 18, 2009 by the Desert Tortoise Council to John Kessler, Project Manager, California Energy Commisssion, Re: Ivanpah Solar Electric Generating System (07-AFC-5). 4 pp.; dated 12/18/2009, Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 515 Jennings, B.J. 1997. Habitat Use and Food Preferences of the Desert Tortoise, *Gopherus agassizii,* in the Western Mojave Dersert and Impacts of Off-Road Vehicles. Projceedings: Conservation, Restoration, and Management of Tortoises and turtles-An International Conference, pp. 42-45. New York Turtle and Tortoise Society; dated 1997. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 516 Rebuttal Testimony Of Intervenor Western Watersheds Project; dated January 5, 2010, docketed January 5, 2010. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

EXHIBIT 517 Intervenor Western Watersheds Project Opening Testimony for Topics to be Heard in January 2010, Exhibit List, and Proof of Service, dated December 18, 2009. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

Exhibit 518 Figures 1, 2, and 5 from the draft revised tortoise recovery plan dated January 22, 2010, docketed January 25, 2010. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 1/14/2010.

Exhibit 519 Additional Testimony of Michael J. Connor Regarding Impacts to Desert Tortoise, dated March 16, 2010. Sponsored by Intervenor Western Watersheds Project, and admitted into evidence on 3/22/2010.

INTERVENOR SIERRA CLUB EXHIBITS

EXHIBIT 600 Sierra Club's June 2009 Letter proposing an alternative to the ISEGS site configuration; dated 6/22/09, docketed 6/22/09. Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 601 Nussear KE, TC Esque, RD Inman, LL Gass, KA Thomas, CSA Wallace, JB Blainey, DM Miller, RH Webb.2009. Modeling habitat of the desert tortoise (*Gopherus agassizii)* in the Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona: U.S. Geological Survey Open-File Report 2009-1102, dated 2009. Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 602 Collis S, HW Avery. 200. Proximate Constraints affecting the reproductive output and mortality of desert tortoises [abstract]. Proceedings of the Desert Tortoise Council 2000 Symposium. dated 2009. Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 603 Curriculum Vitae for Jim Cornett (undated). Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 604 Cashen, Scott. Map of areas in the Project and I-1 alternative sites surveyed for desert tortoise burrows (undated). Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 605 LaRue EL, Jr. 1992. Distribution of desert tortoise sign adjacent to Highway 395, San Bernardino County, California. Proceedings of the Desert Tortoise Council 1992 Symposium. pp. 190-204 (undated). Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 606 Nicholson L. 1978. The effects of roads on desert tortoise populations. Proceedings of the Desert Tortoise Council 1978 Symposium. pp. 127-129 (undated). Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 607 Boarman WI. 2002. Threats to Desert Tortoise Populations: A Critical Review of the Literature. U.S. Geological Survey, Western Ecological Research Center. Sacramento CA: August 9, 2002. Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 608 Boarman W., M. Sazaki. 2006. A highway's road-effect zone for desert tortoises (*gopherus agassizii)*. Journal of Arid Environments 65:94-101; dated 2006. Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 609 CDFG. 2009 Oct. 27. Comments on the Preliminary Staff Assessment and Recommendations for the Final Staff Assessment for the Ivanpah Solar Electric Generating System (CEC Docket #07-AFC-5). Letter from Kevin Hunting, Deputy Director, Ecosystem Conservation Division to John Kessler, Program Manager Siting, Transmission & Environmental Protection Division, California Energy Commission; dated 10/27/09, docketed 10/28/09. Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 610 Thomas KA, T Keeler-Wolf, J Franklin, P Stine. 2004 Mojave Desert Ecosystem Program: Central Mojave Vegetation Mapping Database. Western Regional Center, U.S. Geological Survey. Technical Report; dated 2004. Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 611 Testimony of Scott Cashen dated _____. Sponsored by Intervenor Sierra Club, and admitted into evidence on 1/14/2010.

EXHIBIT 612 Supplemental Testimony of Scott Cashen dated 3/16/2010, docketed March 17, 2010. Sponsored by Intervenor Sierra Club, and admitted into evidence on 3/22/2010.

INTERVENOR DEFENDERS OF WILDLIFE EXHIBITS

EXHIBIT 700 Defenders of Wildlife Comments on the ISEGS Preliminary Staff Assessment; dated 1/31/2008, docketed 2/1/08. Sponsored by Intervenor Defenders of Wildlife, and admitted into evidence on 1/14/2010.

EXHIBIT 701 Defenders of Wildlife Comments on the Draft Desert Tortoise Relocation Plan for the Ivanpah Solar Electric Generating System (07-AFC-5); dated 5/21/2009, docketed 5/21/09. Sponsored by Intervenor Defenders of Wildlife, and admitted into evidence on 1/14/2010.

EXHIBIT 702 Defenders of Wildlife Additional Comments on Draft Environmental Assessment for Desert Tortoise Translocation; dated 8/31/2009, Sponsored by Intervenor Defenders of Wildlife, and admitted into evidence on 1/14/2010.

EXHIBIT 703 Defenders of Wildlife comments on the Proposed Ivanpah Solar Electric Generating System (07-AFC-5): Cumulative Impact Analysis; dated 7/29/2009, docketed 7/30/09. Sponsored by Intervenor Defenders of Wildlife, and admitted into evidence on 1/14/2010.

EXHIBIT 704 Map identifying private lands suitable for renewable energy development; dated 9/9/2009, Sponsored by Intervenor Defenders of Wildlife, NOT RECEIVED INTO EVIDENCE.

EXHIBIT 705 USGS Report: Modeling Habitat of the Desert Tortoise (Gopherus agassizii) in the Mojave and Parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona; dated 11/2/2009, Sponsored by Intervenor Defenders of Wildlife, and admitted into evidence on 1/14/2010.

EXHIBIT 706 Relevant portions of the USFWS 1994 Desert Tortoise Recovery Plan; dated 2/11/2008, Sponsored by Intervenor Defenders of Wildlife, and admitted into evidence on 1/14/2010.

EXHIBIT 707 BLM Manual 1745; dated 5/9/2008, Sponsored by Intervenor Defenders of Wildlife, and admitted into evidence on 1/14/2010.

EXHIBIT 708 Press release: Senators Feinstein and Merkley Introduce Measure to Spur Renewable Energy Development; dated 12/17/2009, Sponsored by Intervenor Defenders of Wildlife, NOT RECEIVED INTO EVIDENCE.

EXHIBIT 709 DFG Comments on the Preliminary Staff Assessment and Recommendations for the Final Staff Assessment for the Ivanpah Solar Electric Generating System; dated 10/27/2009, docketed 10/28/09. Sponsored by Intervenor Defenders of Wildlife, and admitted into evidence on 1/14/2010.

EXHIBIT 710 Newspaper article: Army grants a stay to desert tortoises (*Los Angeles Times*); dated 10/11/2008, Sponsored by Intervenor Defenders of Wildlife, NOT RECEIVED INTO EVIDENCE.

EXHIBIT 711 Federal Officials Set Aside Worries Over Desert Tortoise, Rare Plant (*Los Angeles Times*); dated 3/26/2004. Sponsored by Intervenor Defenders of Wildlife, NOT RECEIVED INTO EVIDENCE.

EXHIBIT 712 Western Watershed Project's comments on the Environmental Assessment for the Translocation of Desert Tortoises onto Bureau of Land Management and Other Federal Lands in the Superior-Cronese Desert Wildlife Management Area, San Bernardino County, California Bureau of Land Management: Environmental Assessment CA-680-2009-0058; dated 8/31/2009. Sponsored by Intervenor Defenders of Wildlife, Not Received Into Evidence.

EXHIBIT 713 Intervenor Defenders of Wildlife Rebuttal Testimony; dated January 4, 2010, docketed January 4, 2010. Sponsored by Intervenor Defenders of Wildlife, and admitted into evidence on 1/14/2010.

INTERVENOR BASIN AND RANGE WATCH EXHIBITS

EXHIBIT 800 Photo Data Base; dated 12/18/2009, docketed 12/18/2009. Sponsored by Intervenor Basin and Range Watch, and admitted into evidence on 1/11/2010.

Exhibit 801 Additional Testimony of Laura Cunningham, dated March 16, 2010, docketed March 16, 2010. Sponsored by Intervenor Basin and Range Watch, and admitted into evidence on 3/22/2010.

INTERVENOR CENTER FOR BIOLOGICAL DIVERSITY EXHIBITS

EXHIBIT 900 Dodd, C.D. and R.A. Siegel 1991. Relocation, repatriation and Translocation of amphibians and reptiles: are they conservation strategies that work? Herpetologica 47(3): 336-350 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 901 Epps, C.W., P.J. Palsboll, J.D. Wehausen, G.K. Roderick, R.R. Ramey II, and D.R. McCullough 2005. Highways block gene flow and cause a rapid decline in genetic diversity of desert bighorn sheep. Ecology Letter 8: 1029-1038; dated 2005. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 902 Epps, C.W., D.R. McCullough, J.D. Wehausen, V.C. Bleich and J.L. Rechel 2004. Effects of Climate Change on Population Persistence of Desert-Dwelling Mountain Sheep in California. Conservation Biology 18(1): 102-113; February 2004. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 903 Field, K.J., C.R. Tracy, P.A. Medica, R.W. Marlow, and P.S. Corn 2007. Return to the wild: Translocation as a tool in conservation of the desert tortoise (*Gopherus agassizii*) Biological Conservation 136: 232-245; dated 2007. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 904 Frid, A. and L. Dill 2002. Human-caused disturbance stimuli as a form of predation risk. Conservation Ecology 6(1): 11 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 905 Hiatt, H.D., T.E. Olson, J.C. Fisher. 1995. Reseeding four sensitive plant species in California and Nevada. In Proceedings: Wild and Shrub and Arid Land Restoration Symposium. General Technical Report INT-GTR-315. Pgs. 94-99 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 906 Karl, A. E. 2007. Hyundai Motor America Mojave Proving Grounds, Desert Tortoise Translocation Study – 2006 Annual Summary. March 2007. Pgs.20; March 2007. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 907 Lovish, J.E. and R. Daniels 200. Environmental characteristics of desert tortoise (*Gopherus agassizii*) burrow locations in an altered industrial landscape. Chelonian Conservation and Biology 3(4): 714-721; dated 2000. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 908 Luckenbach, R.A. 1985. Ecology and management of the desert tortoise (*Gopherus agassizii*) in California. In R.B. Bury ed., Ecology and conservation of North American tortoises. U.S. Fish and Wildlife Service Research Report 12. Pgs. 1-37 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 909 Murphy, R.W., K.H. Berry, T. Edwards, A.M. McLuckie. (207) A Genetic Assessment of the Recovery Units for the Mojave Population of the desert Tortoise (*Gopherus agassizii*). Chelonian Conservation and Biology 6(2): 229-251; dated 2007. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 910 Palmer, K.S., D.C. Rostal, J.S. Gurmbles, M. Mulvey. 1998. Long-term storage in the desert tortoise (*Gopherus agassizii*). Copiea 3:702-705 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 911 Deacon, James E., Williams, A.E., Williams, C.D., and Williams, J.E.; September 2007, Fueling Population Growth in Las Vegas: How Large-scale Groundwater Withdrawal Could Burn Regional Biodiversity, BioScience Vol. 57 No. 8 688-698 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 912 McCrary et al., Avian Mortality at a Solar Energy Power Plant, J. Field Ornithol., 57(2): 135-141. 1986. Solar One 4 km east of Daggett, San Bernardino County, California (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 913 CBD letter to CEC RE: Comments on Preliminary Staff Assessment December 2008 (07-AFC-5) CEC-700-2008-013-PSA – Ivanpah Solar Electric Generating System and the Draft Desert Tortoise Translocation/Relocation Plan dated July 7, 2009; Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 914 Lovich, J. E., and D. Bainbridge. 1999. Anthropogenic Degradation of the Southern California Desert Ecosystem and Prospects for Natural Recovery and Restoration. Environmental Management Vol. 24, No. 3, pp 309-326 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 915 Brown, D.E. and R. A. Minnich. 1986. Fire and changes in creosote bush scrub of the western Sonoran Desert, California. American Midland Naturalist Vol. 116: 411-422 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 916 Walker, L.R., D.B. Thompson, and F.H. Landau 2001. Experimental manipulations of fertile islands and nurse plant effects in the Mojave desert, USA. Western North American Naturalist 61(1): 25–35 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 917 Brooks, M.L. 2000. Competition Between Alien Annual Grasses and Native Annual Plants in the Mojave Desert. Am. Midl. Nat. 144:92–108 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 918 Brooks, M. L. and J. V. Draper. 2006. Fire effects on seed banks and vegetation in the Eastern Mojave Desert: implications for post-fire management, extended abstract, U.S. Geological Survey, Western Ecological Research Center, Henderson, Nevada, 3 p (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 919 Brooks, M.L. and R.A. Minnich. In Press. Fire in the Southeastern Deserts Bioregion. Chp 16 in: Sugihara, N.G., J.W. van Wagtendonk, J. Fites-Kaufman, K.E. Shaffer and A.E. Thode (eds.). Fire in California Ecosystems. University of California Press, Berkeley.; dated __, docketed __. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 920 Dutcher, K. E. 2009. The effects of wildfire on reptile populations in the Mojave National Preserve, California. Final Report to the National Park Service, California State University, Long Beach, 28 p.; dated January 2009. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 921 Beck, D.D. 1990. Ecology and Behavior of the Gila Monster in Southwestern Utah. Journal of Herpetology, Vol. 24, No. 1 (Mar., 1990), pp. 54-68 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 922 Sullivan, B.K., M.A. Kwiatkowski and G.W. Schuett. 2004. Translocation of urban Gila monsters: a problematic conservations tool. Biological Conservation 117: 235-242 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 923 B. Murphy – Fulcrum Technologies, Inc., The Power and Potential of CdTe (thin-film) PV, presented at 2nd Thin-Film Summit, San Francisco, December 1-2, 2009 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 924 Schreiber, D. - EuPD Research, PV Thin-film Markets, Manufacturers, Margins, presentation at 1st Thin-Film Summit, San Francisco, December 1-2, 2008; November 2008. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 925 CPUC Rulemaking R.06-02-012, Develop Additional Methods to Implement California RPS Program, Pre-Workshop Comments of GreenVolts, Cleantech America, and Community Environmental Council on the 2008 Market Price Referent, March 6, 2008 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 926 E-mail communication between Don Kondoleon, Manager - CEC Transmission Evaluation Program, and Bill Powers of Powers Engineering, January 30, 2008; dated 1/30/2008, Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 927 SCE Application A.08-03-015, Solar Photovoltaic (PV) Program Supplemental Rebuttal Testimony, October 14, 2008; dated 10/14/2008, Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 928 Camp et al. 1997, Viewsheds: a Complimentary Management approach to buffer zones, Wildlife Society Bulletin 1997, 25(3):612-615 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 929 Goodrich and Buskirk 1998. Spacing And Ecology Of North American Badgers (Taxidea Taxus) In A Prairie-Dog (Cynomys Leucurus) Complex, Journal of Mammalogy, 79(1):171-179, 1998 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 930 Klem 1989 Bird window collisions, Wilson Bull., 101(4), 1989, pp. 606-620 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 931 Long 1973. Taxidea taxus, Mammalian Species, No. 26, Taxidea taxus (Jun. 13, 1973) (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 932 Longcore 1997 On the Perils of Ecological Restoration: Lessons from the El Segundo Blue Butterfly; In press, 2nd Interface Between Ecology and Land Development in California J.E. Keeley, Coordinator. Occidental College, April 18-19, 1997 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 933 Richardson and Miller 1997. Recommendations for protecting raptors from human disturbance: a review, Wildlife Society Bulletin 1997, 25(3):634-638 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 934 Jennings, Bryan W., 2002, Diet Selection by the Desert Tortoise in Relation to the Flowering Phenology of Ephemeral Plants Chelonian Conservation and Biology, 2002, 4(2):353-358 (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 935 Shoemaker, V. H., K. A. Nagy, W. R. Costa, Energy Utilization and Temperature Regulation by Jackrabbits (*Lepus californicus*) in the Mojave Desert, Physiological Zoology, Vol. 49, No. 3 (Jul., 1976), pp. 364-375. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 936 National Audubon Society 2008, Important Bird Areas in the U.S. Important Bird Areas in California (IBA), East Mojave Peaks. Available at http://www.audubon.org/bird/iba. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 937 National Audubon Society 2008, Important Bird Areas in the U.S. Important Bird Areas in California (IBA), Audubon IBA Desert Springs, East Mojave Springs. Available at http://www.audubon.org/bird/iba (undated). Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

EXHIBIT 938 Rebuttal Testimony for Topics to be Heard in January, 2010, Additional Exhibits, and ; dated January 5, 2010, docketed January 5, 2010. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/13/2010.

EXHIBIT 939 Opening Testimony for Topics to be Heard in January, 2010, Exhibit List, Exhibits, and Proof of Service, dated 12/17/2009. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/13/2010.

Exhibit 940 Revised testimony of Curtis Bradley, dated December 22, 2009, docketed December 23, 2009. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 1/14/2010.

Exhibit 941 Additional Testimony of Mark C. Jorgensen Re: Impacts to Bighorn Sheep from the Proposed Ivanpah Solar Electric Generating System, dated March 12, 2010, docketed March 16, 2010. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 3/22/2010.

Exhibit 942 Additional Testimony of Ileene Anderson Re: Impacts to Sensitive Wildlife from the Proposed Ivanpah Solar Electric Generating System, dated March 15, 2010, docketed March 16, 2010. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 3/22/2010.

Exhibit 943 Kochert, M. N., K. Steenhof, C. L. Mcintyre and E. H. Craig. 2002. Golden Eagle (Aquila chrysaetos), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu.oca.ucsc.edu/bna/species/684 (undated), docketed March 16, 2010. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 3/22/2010.

Exhibit 944 Article Spatial Use and Habitat Selection of Golden Eagles in Southwestern Idaho John M. Marzluff, Steven T. Knick, Mark S. Vekasy, Linda S. Schueck, and Thomas J. Zarriello; The Auk 114(4):673-687, 1997 (undated) docketed March 16, 2010. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 3/22/2010.

Exhibit 945 Abstract: Thirty-Fifth Annual Meeting and Symposium, The Desert Tortoise Council; Defenders of Wildlife 2010 Abstract: Desert Tortoise, February, 2010, docketed March 16, 2010. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 3/22/2010.

Exhibit 946 Transcript of Video: U.S. Geological Survey, The Heat Is On: Desert Tortoises and Survival (undated), docketed March 16, 2010. Sponsored by Intervenor Center for Biological Diversity, and admitted into evidence on 3/22/2010.

Exhibit 947 Supplemental Testimony of Bill Powers, P.E. dated 3/16/2010, docketed March 16, 2010. Sponsored by Intervenor Center for Biological Diversity, RECEIVED AS PUBLIC COMMENT.

INTERVENOR CALIFORNIA NATIVE PLANT SOCIETY EXHIBITS

EXHIBIT 1000 California Native Plant Society, 1989. Policy on Transplanting (undated). Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1001 California Native Plant Society, 1989a. CNPS Statement Opposing Transplantation as a Mitigation to Rare Plants. Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1002 California Native Plant Society, 1989b. CNPS Policy on Mitigation Guidelines regarding Impacts to Rare, Threatened, and Endangered Plants; (2/11/91, revised 4/98). Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1003 California Public Resource Code, Section 21083 (2). (p.22); Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1004 Leppig, G. and J.W. White. 2006. Conservation of peripheral plant populations in California. Madrono 53(3): 264-274.; Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1005 Pavlik, B. 2008. The California Deserts: An Ecological Rediscovery. University California Press: Berkeley, CA, pp. (3); Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1006 Saunders, D., R. Hobbs, and C. Margules. 1991. Biological Consequences of ecosystem fragmentation: A review. Conservation Biology 5(1):18-32; Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1007 Thrall, P.H., J.J. Burdon, and B.R. Murray. 2000. The metapopulation paradigm: a fragmented view of conservation biology. In: Young, A.G. and G.M. Clarke) Genetics, Demography, and Viability of Fragmented Populations. Cambridge University Press: Cambridge, UK, pp. 75-95.; Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1008 Wohlfahrt, G., L. Fensternmaker, and J. Arnone. 2008. Large annual net ecosystem CO_2 uptake of a Mojave Desert ecosystem. Global Change Biology 14: 1475-1487.; Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1009 Dseyrt, J., T. Keeler-Wolf, and J. Evens. 2009. A Manual of California Vegetation, 2nd Edition. California Native Plant Society Press: Sacramento, CA, pp. 566-569; Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1010 Hampe, A., and R. Petit. 2005. Conserving biodiversity under climate change: the rear edge matters. Ecology Letters 8: 461-467; Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1011 Lesica, P. and F. Allendorf. 1995. When are peripheral populations valuable for conservation? Conservation Biology 9(4): 753-760; Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1012 Rebuttal Testimony of California Native Plant Society, dated January 4, 2010, docketed January 4, 2010. Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

EXHIBIT 1013 Voucher records for 6 taxa that either occur nearer or at lower elevations to the Ivanpah SEGS site than what is presented in the Applicant's Rebuttal Testimony, Table Bio-1, dated January 14, 2010, docketed January 14, 2010, Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 1/14/2010.

Exhibit 1014 Opening Testimony of California Native Plant Society, dated December 18, 2009. Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 3/22/2010.

Exhibit 1015 Supplemental Testimony of California Native Plant Society, dated 3/16/2010, docketed March 22, 2010. Sponsored by Intervenor California Native Plant Society, and admitted into evidence on 3/22/2010.

INTERVENOR COUNTY OF SAN BERNARDINO EXHIBITS

EXHIBIT 1100 County of San Bernardino 2007 General Plan; Sponsored by Intervenor County of San Bernardino, and admitted into evidence on 1/14/2010.

EXHIBIT 1101 Memorandum of Understanding Between the County of San Bernardino and the U.S. Department of the Interior, Bureau Of Land Management for Processing of Environmental Reviews, March 18, 2008; Sponsored by Intervenor County of San Bernardino, and admitted into evidence on 1/14/2010.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
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APPLICATION FOR CERTIFICATION FOR THE *IVANPAH SOLAR ELECTRIC GENERATING SYSTEM*

DOCKET NO. 07-AFC-5
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DECLARATION OF SERVICE

I, _____, declare that on _____, 2010, I served and filed copies of the attached, _____ dated, _____, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[www.energy.ca.gov/sitingcases/ivanpah]**.

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Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

_____
Signature of Sender