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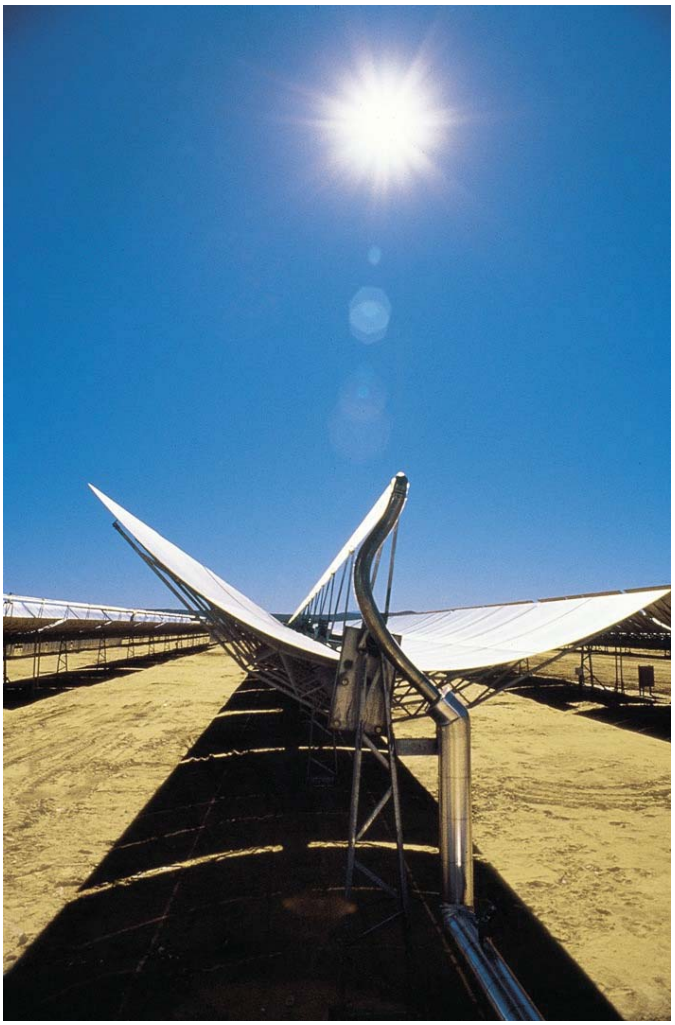
PALEN SOLAR POWER PROJECT

Revised Staff Assessment, Part I



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DISCLAIMER

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PALEN SOLAR POWER PROJECT (09-AFC-7)
REVISED STAFF ASSESSMENT

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INTRODUCTION

This Revised Staff Assessment (RSA) is being published by California Energy Commission staff. The predecessor to this report was a Staff Assessment /Draft Environmental Impact Statement (SA/DEIS) which was a joint document published by both the California Energy Commission (Energy Commission) and the U.S. Bureau of Land Management (BLM).

On April 7, 2010 Energy Commission staff and BLM determined that they would each develop and publish a separate final document. The BLM's document will be called the Final Environmental Impact Statement (FEIS).

Although Energy Commission staff and BLM are no longer publishing a joint document, Energy Commission staff and the BLM continue to share expertise, information and documentation in order to promote intergovernmental coordination at the local, state, and federal levels.

In the interests of producing a clear, comprehensive, and thorough report that addresses the same issues that were included in the published SA/DEIS, Energy Commission staff, in consultation with BLM, determined that it would retain the joint document format and language to the extent that such language does not result in any confusion as to staff's analysis. As such, the RSA contains some references to BLM and the National Environmental Policy Act (NEPA). However, this is for informational purposes only. This document is an Energy Commission staff document only. It is not intended to serve as a BLM or NEPA document.

The Bureau of Land Management (BLM) shares jurisdiction for this project due to the project location on federal land. While this document is not written jointly with the BLM, the proponent will be required to comply with all terms and conditions required by the BLM, as will be described in the BLM's Record of Decision and Right-of-Way grant documents for this project. The conditions of certification within this document may also require the submittal of documents and reports to other federal, state, or local agencies. It is the project owner's responsibility to ensure the timely submittal of these documents and reports.

This RSA contains staff's independent evaluation of the Palen Solar I[1] (applicant) Palen Solar Power Project application which was filed with the BLM and Energy Commission. The application filed with BLM is the BLM Application for a Right-of-Way (ROW) Grant on BLM-administered land (CACA 048810) and the application filed with the Energy Commission is the Application for Certification (09-AFC-7). The RSA examines engineering, environmental, public health and safety aspects of the Palen Solar Power

[1] Chevron Energy Solutions and Solar Millennium have a joint development agreement. Chevron Energy Solutions applied for the Right of Way for Palen Solar Power Project. To facilitate the permitting of the Palen Solar Power Project (PSPP), the Applicant is requesting that the CEC issue one License to a Project- specific company. The company for PSPP is Palen Solar I, LLC a wholly owned subsidiary of Solar Millennium and the single Applicant for the PSPP.

Project (PSPP), based on the information provided by the applicant and other sources available at the time the RSA was prepared.

The applicant has also applied for the American Recovery and Reinvestment Funds (ARRA) Renewable Energy Grant Program. Two goals of the ARRA Renewable Energy Grant Program are to enhance America's energy independence and create near-term employment opportunities for Americans. To be eligible for the ARRA funds, the applicant must begin construction on PSPP or expend five percent of the costs of the Palen project by the end of 2010.

The RSA examines engineering, environmental, public health and safety aspects of the proposed project, based on the information provided by the applicant and other sources available at the time the RSA was prepared. The RSA includes analyses normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA).

When considering a 50 megawatt or greater thermal power plant for licensing, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR. In support of its certification process, the Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its potential effects on the environment, the public's health and safety, and whether the project conforms with all applicable local, state, and federal laws, ordinances, regulations and standards (LORS). The staff also recommends measures to mitigate potential significant adverse environmental effects, which take the form of conditions of certification for construction, operation, maintenance and eventual decommissioning of the project. This RSA is not the decision document for these proceedings nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local/state/federal legal requirements. The RSA will serve as staff's testimony in evidentiary hearings to be held by a Committee of two Commissioners who are overseeing this case. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, the applicant, all parties, government agencies, and the public prior to proposing its decision. The Energy Commission will make a final decision, including findings, after the Committee's publication of the Presiding Member's Proposed Decision.

PROPOSED PROJECT LOCATION AND DESCRIPTION

The proposed Palen Solar Power Project (PSPP) is a concentrated solar thermal electric generating facility with two adjacent and independent units of 250 megawatt (MW) nominal capacity each for a total nominal capacity of 500 MW. The project site is located approximately 0.5 mile north of U.S. Interstate-10 (I-10) and approximately 10 miles east of Desert Center, in an unincorporated area of eastern Riverside County, California.

The proposed project site includes one privately-owned 40-acre parcel, which has been incorporated into the proposed eastern solar field. The remainder of the Project facilities

would be located entirely on BLM-administered land, BLM ROW # CACA 48810, in Township 6 South, Range 17 East.

In the original SA/DEIS, staff analyzed the proposed project, Reconfigured Alternative #1, and Reduced Acreage Alternative. In its analysis, Energy Commission Staff found that the proposed project and the Reconfigured Alternative #1 would have had substantial impacts to biological resources. Staff was particularly concerned about the biological impacts to the Mojave fringe-toed lizard and the sand transport corridor. The applicant stated that the Reduced Acreage Alternative was not economically feasible.

The applicant disagrees that the project as originally proposed would result in unmitigable significant adverse impacts to biological resources; however, in an effort to accommodate staff's and the other biological agencies' concerns, the applicant developed and submitted for consideration two other site configuration alternatives: Reconfigured Alternative #2 and Reconfigured Alternative #3.

The key difference between Reconfigured Alternative #2 and Reconfigured Alternative #3 is the use of the private land near the south-east corner of the PSPP. The applicant is currently discussing the possibility of purchasing this private land with the landowners. Therefore, the applicant has requested, and staff concurs, that the Committee consider both Reconfigured Alternative #2 and Reconfigured Alternative #3 for certification. The outcome of the discussions between the applicant and landowners will determine which project the applicant will develop.

The applicant is seeking a right-of-way grant for approximately 5,200 acres of public land administered by the Bureau of Land Management (BLM). Construction and operation of the project would disturb a total of about 2,970 acres. PSPP would consist of two adjacent and, independent units of 250 megawatts (MW) nominal capacity each for a total nominal capacity of 500 MW.

The proposed project would utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola. A heat transfer fluid (HTF) is heated to high temperature (750°F) as it circulates through the receiver tubes. The heated HTF is then piped through a series of heat exchangers where it releases its stored heat to generate high pressure steam. The steam is then fed to a traditional steam turbine generator where electricity is produced.

MAJOR COMPONENTS OF THE PROPOSED PROJECT

The following items are some of the major activities and components of PSPP. For a more exhaustive list, please see **Section B.1.2**, in the **Project Description** section.

Project Construction

Project construction is expected to occur over a total of 39 months. Project construction would require an average of 566 employees over the entire 39-month construction

period, with manpower requirements peaking at approximately 1,140 workers in Month 17 of construction. The construction workforce would consist of a range of laborers, craftsmen, supervisory personnel, support personnel, and management personnel.

Temporary construction parking areas will be provided within the power plant site adjacent to the laydown area. The plant laydown area will be utilized throughout the build out of the two solar units.

Operation and Maintenance

While electrical power is to be generated only during daylight hours, PSPP would be staffed 24 hours a day, 7 days per week. A total estimated workforce of 134 full time employees would be needed with both units operating.

Transmission Line Route

The single circuit 230 kV generation tie line will exit the northwest corner of the PSPP and travel west and south through BLM lands crossing the I-10 and proceeding south into SCE's planned Red Bluff substation.

Fuel Supply and Use

The auxiliary boiler would be fueled by propane. Propane would be delivered to the plant site via truck from a local distributor and stored in 18,000-gallon above ground tanks (one in each power block). The estimated propane usage per unit for normal operations is 8 MMBtu/hr overnight and 34 MMBtu/hr for one half-hour during startup each morning. The boiler will run at 100% load overnight when supplemental HTF freeze protection is needed, which is estimated at 100 hours per year.

Water Supply and Use

The project would be dry cooled. The project's primary water uses include solar mirror washing, feedwater makeup, fire water supply, onsite domestic use, and cooling water for auxiliary equipment heat rejection.

Water Requirements

The average water requirement for each of the two power plants is estimated to be about 150 acre feet per year (afy) for a total of 300 afy, which corresponds to an average flow rate of about 188 gallons per minute (gpm), based on pumping 24 hours per day, 350 days per year. Usage rates during operation would vary during the year and would be higher in the summer months when the peak maximum flow rate could be as much as about 50% higher (about 275 gpm).

Water Source and Quality

The project water needs would be met by use of groundwater pumped from up to ten wells on the plant site. Water for domestic uses by project employees would also be provided by onsite groundwater treated to potable water standards.

It is expected that new water supply wells in the project site would adequately serve the entire project. Multiple wells would provide redundancy and backup water supply in the event of outages or maintenance of one or more of the other wells.

Solar Mirror Washing Water

At each solar field, to facilitate dust and contaminant removal, water from the demineralization process would be sprayed on the solar collectors for cleaning. The collectors would be cleaned once or twice per week, determined by the reflectivity monitoring program. This mirror washing operation would be done at night and involves a water truck spraying treated water on the mirrors in a drive-by fashion. The applicant expects that the mirrors would be washed weekly in winter and twice weekly from mid spring through mid fall. Because the mirrors are angled down for washing, water does not accumulate on the mirrors; instead, it would fall from the mirrors to the ground and, due to the small volume, is expected to soak in with no appreciable runoff. Any remaining rinse water from the washing operation would be expected to evaporate on the mirror surface. The treated water production facilities would be sized to accommodate the solar mirror washing demand of about 114 afy.

If approved, project construction would begin in the fourth quarter of 2010, with commercial operation commencing in the second quarter of 2013.

PROPOSED PROJECT OBJECTIVES

The specific objectives and purpose of PSPP, as identified by the applicant, are:

- To develop a utility-scale solar energy project utilizing parabolic trough technology.
- To construct and operate an environmentally friendly, economically sound, and operationally reliable solar power generation facility that would contribute approximately 2,000,000 megawatt hours (MWh) of clean, renewable solar energy per year to the State of California's renewable energy goals.
- To locate the project in an area with high solar insolation (i.e., high intensity of solar energy).
- To interconnect directly to the California Independent System Operator Grid through the Southern California Edison (SCE) electrical transmission system while minimizing additions to electrical infrastructure (e.g., avoiding lengthy new transmission lines).

Additionally, the applicant states the need for the project as:

- Support U.S. Secretary of the Interior Salazar's Order 3285 making the production, development and delivery of renewable energy top priorities for the United States.
- Support Governor Schwarzenegger's Executive Order S-14-08 to increase the State's Renewable Energy Standard to 33% renewable power by 2020.
- Support the greenhouse gas reduction goals of Assembly Bill 32 (California Global Warming Solutions Act of 2006).

- Sustain and stimulate the economy of Southern California by helping to ensure an adequate supply of renewable electrical energy, while creating additional construction and operations employment and increased expenditures in many local businesses.

SUPPORT FOR PROPOSED PROJECT

After considering the objectives set out by the applicant, the Energy Commission staff has identified the following basic project objectives, in accordance with CEQA requirements:

- To construct a utility-scale solar energy project of up to 500 MW and interconnect directly to the CAISO Grid while minimizing additions to electrical infrastructure; and
- To locate the facility in areas of high solar insolation.
- In addition, when considering retention or elimination of alternative renewable technologies, in addition to evaluating the likelihood of reducing or eliminating the potential impacts of Palen Solar Power Project at its proposed site, staff evaluated whether alternative technologies could meet the following key project objectives:
- To provide clean, renewable electricity and to assist SCE in meeting its obligations under California's Renewable Portfolio Standard Program (RPS);
- To assist SCE in reducing its greenhouse gas emissions as required by the California Global Warming Solutions Act; and
- To contribute to the achievement of the 33% renewables RPS target set by Governor Schwarzenegger

DOE PURPOSE AND NEED

The Applicant has applied to the Department of Energy (DOE) for a loan guarantee under Title XVII of the Energy Policy Act of 2005 (EPAct 05), as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, P.L. 111-5 (the "Recovery Act"). DOE is a cooperating agency on this EIS pursuant to an MOU between DOE and BLM signed in January 2010. The purpose and need for action by DOE is to comply with its mandate under EPAct 05 by selecting eligible projects that meet the goals of the Act.

EPAct 05 established a Federal loan guarantee program for eligible energy projects, and was amended by the Recovery Act to create Section 1705 authorizing a new program for rapid deployment of renewable energy projects and related manufacturing facilities, electric power transmission projects, and leading edge biofuels projects. The primary purposes of the Recovery Act are job preservation and creation, infrastructure investment, energy efficiency and science, assistance to the unemployed, and State and local fiscal stabilization. The Section 1705 Program is designed to address the current economic conditions of the nation, in part, through renewable energy, transmission and leading edge biofuels projects.

A.6.4. AGENCY COORDINATION

The Energy Commission and BLM seek comments from and work closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies may include as applicable, the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State Water Resources Control Board/Regional Water Quality Control Board, State Historic Preservation Officer, California Department of Fish and Game, and the South Coast Air Quality Management District. On December 21, 2009, the Energy Commission staff sent the PSPP AFC to all local, state, and federal agencies that might be affected by or have an interest in the proposed project.

Copies of the SA/DEIS were also provided to these same state and local agencies on March 23, 2010.

A.7 PUBLIC COORDINATION

Energy Commission regulations require staff to send notices regarding receipt of an AFC and Commission events and reports related to proposed projects, at a minimum, to property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines and water lines). This was done for PSPP on December 21, 2009.

Notice of the SA/DEIS were also provided on March 23, 2010.

The Bureau of Land Management and Energy Commission's outreach efforts are an ongoing process that, to date, has involved the following efforts:

BLM SCOPING MEETING

The Notice of Intent to prepare an environmental impact statement for this proposed project was published in the *Federal Register* on November 23, 2009. On December 11, 2009, BLM held its Scoping Meeting at the University of California-Riverside, Palm Desert Campus.

LIBRARIES

On December 21, 2009, the Energy Commission staff sent the PSPP AFC to the following libraries: Riverside Main Library, Palo Verde Valley District Library, Lake Tamarisk Library, Coachella Branch Library, and Cathedral City Branch Library.

In addition to these local libraries, copies of the AFC are also available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, as well as, public libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco. On March 23, 2010, the Energy Commission provided these same libraries with a copy of the SA/DEIS.

Copies of the AFC were also provided to all state and local agencies that would have had permitting responsibilities except for the exclusive siting authority of the Energy Commission.

PUBLIC OUTREACH EFFORTS

The Energy Commission staff provided notification by letter and enclosed a notice of the January 25, 2010 Informational Hearing and Site Visit for PSPP, which included a joint presentation by Energy Commission staff and the BLM. In addition to property owners and persons on the general project mail-out list, notification was provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project. Also, elected and certain appointed officials were similarly notified of the hearing and site visit.

DATA REQUEST AND DATA RESPONSE AND ISSUE RESOLUTION WORKSHOPS

The Energy Commission staff provided notification by letter and enclosed a notice of the December 9, 2009 Data Request Workshop and the January 7, 2010 Data Response and Issue Resolution Workshop to property owners and persons on the general project mail-out list. BLM attended these workshops held by the Energy Commission staff. Notification was also provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project.

STAFF ASSESSMENT WORKSHOPS

The Energy Commission staff provided notification by letter and enclosed a notice of the April 16, 2010 Biological Workshop and the April 28 and 29 Staff Assessment Workshop to property owners and persons on the general project mail-out list. In addition, the April 28 and 29 Workshop was continued to May 7, 2010.

BLM attended these workshops held by the Energy Commission staff. Notification was also provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project.

NOTIFICATION TO THE LOCAL NATIVE AMERICAN COMMUNITY

On December 9, 2009, December 21, 2009, January 7, 2010, and March 23, 2010, the Energy Commission staff sent mail-outs regarding the project to the Native American Heritage Commission.

The BLM has notified affected Indian Tribes regarding the proposed project, has sought their comments, and has invited them to consult on the project on a government-to government basis. The affected Indian Tribes are currently working with the BLM.

ENERGY COMMISSION'S PUBLIC ADVISER'S OFFICE

The Public Adviser helps the public participate in the Energy Commission's hearings and meetings. The Public Adviser assists the public by advising them how they can participate in the Energy Commission process; however, the Public Adviser does not represent members of the public. The Public Adviser's Office attended and presented information at the January 25, 2010 Informational Hearing and Site Visit.

ENVIRONMENTAL JUSTICE

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 federal agencies to achieve environmental justice as part of this mission. The order requires the United States Environmental Protection Agency (US EPA) and all other federal agencies 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 or low-income populations. Some agencies have also interpreted this order as applying to state agencies that receive federal funding. While there remains some ambiguity over whether this directive applies to the Energy Commission, staff has decided to assume that it does and conduct the appropriate analysis.

In considering environmental justice in energy facility siting cases, staff uses a demographic screening analysis to determine whether a low-income and/or minority population exists within the potentially affected area of the proposed site. The demographic screening is based on information contained in two documents: Environmental Justice: Guidance Under the National Environmental Policy Act (Council on Environmental Quality, December, 1997) and Guidance for Incorporating Environmental Justice Concerns in EPA’s Compliance Analyses (U.S. Environmental Protection Agency, April, 1998). The screening process relies on Year 2000 U.S. Census data to determine the presence of minority and below-poverty-level populations. Environmental Justice: Guidance Under the National Environmental Policy Act, defines minority individuals as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is identified when the minority population or the below-poverty-level population of the potentially affected area is

(1) greater than 50%; or

(2) when one or more U.S. Census blocks in the potentially affected area have a minority population or below-poverty-level population of greater than 50%.

In addition to the demographic screening analysis, staff follows the steps recommended by the U.S. EPA’s guidance documents which are: outreach and involvement; and if warranted, a detailed examination of the distribution of impacts on segments of the population.

The following 11 sections are reviewed for Environmental Justice: Air Quality, Hazardous Materials, Land Use, Noise, Public Health, Socioeconomics, Soils and Water, Traffic and Transportation, Transmission Line Safety/Nuisance, Visual Resources, and Waste Management. Over the course of the analysis for each of the 11 areas, staff considered potential impacts and mitigation measures and whether there would be a significant impact on an environmental justice population.

Of these 11 sections, Hazardous Materials, Land Use, Soils and Water, and the Visual Resources sections are still being written and will be discussed in Part II of the RSA.,

However, Air Quality, Noise, Public Health, Socioeconomics, Traffic and Transportation, Transmission Line Safety/Nuisance, and Waste Management staff determined that the remaining technical areas did not involve potential environmental impacts that could contribute to a disproportionate impact on an environmental justice population, and so did not necessitate further environmental justice analysis.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES AND MITIGATION

With the exception of the technical areas identified below, staff believes that Alternatives 2 and 3, as currently proposed, including the applicant's proposed mitigation measures and the staff's proposed conditions of certification, PSPP would comply with all applicable laws, ordinances, regulations, and standards (LORS).

In addition, six technical areas are currently undetermined with respect to mitigation of potential impacts and/or for conformance with applicable LORS and will be addressed in Part 2 of the RSA that will be completed later in mid-September. For a more detailed review of potential impacts and LORS conformance for the technical areas contained in this RSA Part 1, see staff's technical analyses that appear later in the document. The status of all technical areas is summarized in the table below and the subsequent text.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality/Greenhouse Gases	Yes	Yes
Biological Resources	**Undetermined**	**Undetermined**
Cultural Resources	**Undetermined**	**Undetermined**
Efficiency	Yes	Yes
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	**Undetermined**	**Undetermined**
Land Use	**Undetermined**	**Undetermined**
Noise and Vibration	Yes	Yes
Public Health	Yes	Yes
Reliability	Not Applicable	Not Applicable
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	**Undetermined**	**Undetermined**
Traffic & Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	**Undetermined**	**Undetermined**
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

SUPPLEMENTAL FILINGS

In the six technical areas noted above, staff requires either further discussion and analysis, or is awaiting conditions from a permitting agency prescribing mitigation.

Staff will work to resolve the outstanding issues and plans on issuing The Revised Staff Assessment, Part II publication in mid-September 2010. The Revised Staff Assessment, Part II will contain the following sections: Biological Resources, Cultural Resources, Hazardous Materials, Land Use, Soil & Water Resources, and Visual Resources, as well as, the Transmission System Engineering Appendix A and the table of Response to Comments.

REFERENCES

Solar Millennium2009a -Solar Millennium (tn: 52939). Application for Certification Vol 1 & 2, dated 8/24/2009.

Solar Millennium2009b -Solar Millennium (tn: 54008). Data Adequacy Supplement, dated 10/26/2009.

Solar Millennium2010l- Solar Millennium, (tn: 57442). Applicant's Supplementary Information - Reconfigured Alternative 2 & Reconfigured Alternative 3, Bio Resources, dated 7/2/2010.

Galati & Blek2010i- Galati & Blek LLP (tn: 56542). Applicant's Initial Comments on the SA-DEIS, dated 5/4/2010.

A – INTRODUCTION

Alan Solomon

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When considering a project for licensing, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR. Similarly, BLM is the Federal lead agency for the NEPA review of the proposed ROW.

In support of its certification process, the Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its

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A.1 AGENCY AUTHORITIES AND RESPONSIBILITIES

The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and by federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, the Energy Commission typically seeks comments from and works closely with other regulatory agencies that administer LORS that are applicable to the proposed project. The following paragraphs describe the agency coordination that has occurred throughout this RSA process.

A.1.1 U.S. BUREAU OF LAND MANAGEMENT (BLM)

The BLM authority and policy guidance for making a decision related to the proposed action flows from the Federal Land Policy and Management Act (FLPMA) of 1976 [43 United States Code (U.S.C.) 1701 et seq.], Section 211 of the Energy Policy Act (EPAct) of 2005 (119 Stat. 594, 600), and BLM's Solar Energy Development Policy of April 4, 2007. FLPMA authorizes BLM to issue ROW grants for systems for generation, transmission, and distribution of electric energy. Section 211 of the Energy Policy Act of 2005 states that the Secretary of the Interior should seek to have approved a minimum of 10,000 megawatts of renewable energy generating capacity on public lands by 2015.

A.1.2 CALIFORNIA ENERGY COMMISSION

The Energy Commission has the exclusive authority to certify the construction, modification, and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and by federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). The Energy Commission must review power plant AFCs to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts (Pub. Resources Code, § 25519), and compliance with applicable governmental laws or standards (Pub. Resources Code, § 25523 (d)). The Energy Commission staff's analyses were prepared in accordance with Public Resources Code, section 25500 et seq.; Title 20, California Code of Regulations, section 1701 et seq.; and CEQA (Pub. Resources Code, § 21000 et seq.).

A.1.3 U.S. FISH AND WILDLIFE SERVICE (USFWS) AND THE CALIFORNIA DEPARTMENT OF FISH AND GAME (CDFG)

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction to protect threatened and endangered species under the Endangered Species Act (ESA) [16 U.S.C. § 1531 et seq.]. Formal consultation with the USFWS under Section 7 of the ESA is required for any federal action that may adversely affect a federally-listed species. This consultation will be initiated through a request by the federal Agency to initiate formal consultation and the submittal of a Biological Assessment (BA) which determines that the proposed project is likely to adversely affect a listed species. Following review of the BA, the USFWS is expected to issue a Biological Opinion (BO) which will specify reasonable and prudent measures which must be implemented for any protected species.

California Department of Fish and Game

The California Department of Fish and Game (CDFG) has the authority to protect water resources of the state through regulation of modifications to streambeds, under Section 1602 of the Fish and Game Code. The Energy Commission, BLM, and the applicant have provided information to CDFG to assist in their determination of the impacts to streambeds, and identification of permit and mitigation requirements. The applicant filed a Streambed Alteration Agreement with CDFG. The requirements of the Streambed Alteration Agreement will be included as a recommended Condition of Certification/Mitigation Measure.

CDFG also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act (CESA). The applicant will be required to file an incidental take permit application. The requirements of the Incidental Take Permit will be included as a recommended Condition of Certification/Mitigation Measure.

A.1.4 OTHER AGENCIES WITH AUTHORITY

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) has jurisdiction to protect water quality and wetland resources under Section 404 of the Clean Water Act. Under that authority, USACE reviews proposed projects to determine whether they may impact such resources, or are subject to a Section 404 permit. Throughout the RSA process, the Energy Commission and BLM have provided information to the USACE to assist them in making a determination regarding their jurisdiction and need for a Section 404 permit. The USACE has preliminarily determined that the project would be in closed basins and thus not regulated per Section 404.

Other Agencies

For a comprehensive review of all agencies and their corresponding permits, licenses, and other LORS conformance, see staff's technical analyses in the RSA.

A.2 CASE AND PROPERTY DESCRIPTION

The proposed Palen Solar Power Project (PSPP) is a concentrated solar thermal electric generating facility with two adjacent, independent, and identical units of 250 megawatt (MW) nominal capacity each for a total nominal capacity of 500 MW. The project site is located approximately 0.5 mile north of U.S. Interstate-10 (I-10) and approximately 10 miles east of Desert Center, in an unincorporated area of eastern Riverside County, California.

The proposed project site includes one privately-owned 40-acre parcel, which has been incorporated into the proposed eastern solar field. The remainder of the Project facilities would be entirely on BLM-administered land, BLM ROW # CACA 48810, in Township 6 South, Range 17 East.

The applicants are seeking a right-of-way grant for approximately 5,200 acres of public land administered by the Bureau of Land Management (BLM). Construction and operation of the project would disturb a total of about 2,970 acres. Any difference between the number of acres in the Right-of-Way application and the total acres disturbed would revert back to the BLM.

The following Riverside County Assessor's Parcel Numbers can be found within the proposed project boundary:

APN 810110022	APN 810110023	APN 810110007	APN 810110027
APN 810110028	APN 810110029	APN 810182002	APN 810190003
APN 810190004	APN 810170001	APN 810140021	

A.3 BLM LAND USE PLAN CONFORMANCE

The principal land use plan affecting this proposed project is the U.S. Bureau of Land Management's California Desert Conservation Area (CDCA) Plan of 1980, as amended.

In the CDCA Plan, the location of the proposed PSPP facility includes land that is classified as Multiple-Use Class L (Limited Use). The Plan states that solar power facilities may be allowed within Limited Use areas after NEPA requirements are met. This DEIS acts as the mechanism for complying with those NEPA requirements. Because solar power facilities are an allowable use of the land as it is classified in the CDCA Plan, the proposed action does not conflict with the Plan. However, Chapter 3, "Energy Production and Utility Corridors Element" of the Plan also requires that newly proposed power facilities that are not already identified in the Plan be considered through the Plan Amendment process. The proposed PSPP facility is not currently identified within the Plan, and therefore a Plan Amendment is required to include the facility as a recognized element within the Plan.

PLANNING CRITERIA (BLM)

The CDCA Plan planning criteria are the constraints and ground rules that guide and direct the development of the Plan Amendment. They ensure that the Plan Amendment

is tailored to the identified issues and ensure that unnecessary data collection and analyses are avoided. They focus on the decisions to be made in the Plan Amendment, and will achieve the following:

> "Sites associated with power generation of transmission not identified in the Plan will be considered through the Plan Amendment process."

Because the proposed facility is not currently identified within the CDCA Plan, an amendment to identify the proposed facility within the Plan is hereby proposed. As specified in Chapter 7, Plan Amendment Process, there are three categories of Plan Amendments, including:

- Category 1, for proposed changes that will not result in significant environmental impact or analysis through an EIS;
- Category 2, for proposed changes that would require a significant change in the location or extent of a multiple-use class designation; and
- Category 3, to accommodate a request for a specific use or activity that will require analysis beyond the Plan Amendment Decision.

Based on these criteria, approval of the proposed project would require a Category 3 amendment. This section summarizes the procedures necessary to evaluate the proposed Plan Amendment, as well as the procedures required to perform the environmental review of the ROW application.

Statement of Plan Amendment

The Implementation section of the Energy Production and Utility Corridors Element of the CDCA Plan lists a number of Category 3 amendments that have been approved since adoption of the Plan in 1980. An additional amendment is proposed to be added to this section of the Plan, and would read "Permission granted to construct solar energy facility (proposed PSPP Project)."

Plan Amendment Process

The Plan Amendment process is outlined in Chapter 7 of the Plan. In analyzing an applicant's request for amending or changing the Plan, the BLM District Manager, Desert District, will:

1. Determine if the request has been properly submitted and if any law or regulation prohibits granting the requested amendment.
2. Determine if alternative locations within the CDCA are available which would meet the applicant's needs without requiring a change in the Plan's classification, or an amendment to any Plan element.
3. Determine the environmental effects of granting and/or implementing the applicant's request.
4. Consider the economic and social impacts of granting and/or implementing the applicant's request.

5. Provide opportunities for and consideration of public comment on the proposed amendment, including input from the public and from federal, State, and local government agencies.
6. Evaluate the effect of the proposed amendment on BLM management's desert-wide obligation to achieve and maintain a balance between resource use and resource protection.

Decision Criteria for Evaluation of Proposed Plan Amendment

The Decision Criteria to be used for approval or disapproval of the proposed amendment require that the following determinations be made by the BLM Desert District Manager:

1. The proposed amendment is in accordance with applicable laws and regulations;
2. The proposed amendment will provide for the immediate and future management, use, development, and protection of the public lands within the CDCA.

The BLM Desert District Manager will base the rationale for these determinations on the principles of multiple uses, sustained yield, and maintenance of environmental quality as required in FLPMA.

Decision Criteria for Evaluation of Application

In addition to defining the required analyses and Decision Criteria for Plan Amendments, the Plan also defines the Decision Criteria to be used to evaluate future applications in the Energy Production and Utility Corridors Element of Chapter 3. These Decision Criteria include:

1. Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors;
2. Encourage joint-use of corridors for transmission lines, canals, pipelines, and cables;
3. Provide alternative corridors to be considered during processing of applications;
4. Avoid sensitive resources wherever possible;
5. Conform to local plans whenever possible;
6. Consider wilderness values and be consistent with final wilderness recommendations;
7. Complete the delivery systems network;
8. Consider ongoing projects for which decisions have been made; and
9. Consider corridor networks which take into account power needs and alternative fuel resources.

A.4 CEQA PROJECT OBJECTIVES

CEQA guidelines require a clearly written statement of objectives to guide the lead agency in developing a reasonable range of alternatives and aid decision-makers in preparing findings or a statement of overriding considerations. CEQA specifies that the

statement of objectives should include the underlying purpose of the project (Section 15126.6(a)). After considering the objectives set out by the applicant, the Energy Commission has identified the following basic project objectives, which are used to evaluate the viability of alternatives in accordance with CEQA requirements:

- To construct a utility-scale solar energy project of up to 1,000 MW and interconnect directly to the CAISO Grid while minimizing additions to electrical infrastructure; and
- To locate the facility in areas of high solar insolation.
- In addition, when considering retention or elimination of alternative renewable technologies, in addition to evaluating the likelihood of reducing or eliminating the potential impacts of Palen Solar Power Project at its proposed site, staff evaluated whether alternative technologies could meet the following key project objectives:
- To provide clean, renewable electricity and to assist Southern California Edison (SCE) in meeting its obligations under California's Renewable Portfolio Standard Program (RPS);
- To assist SCE in reducing its greenhouse gas emissions as required by the California Global Warming Solutions Act; and
- To contribute to the achievement of the 33% renewables RPS target set by California's governor

The specific objectives and purpose of PSPP, as identified by the applicant, are:

- To develop a utility-scale solar energy project utilizing parabolic trough technology.
- To construct and operate an environmentally friendly, economically sound, and operationally reliable solar power generation facility that would contribute approximately 2,000,000 megawatt hours (MWh) of clean, renewable solar energy per year to the State of California's renewable energy goals.
- To locate the project in an area with high solar insolation (i.e., high intensity of solar energy).
- To interconnect directly to the CAISO Grid through the SCE electrical transmission system while minimizing additions to electrical infrastructure (e.g., avoiding lengthy new transmission lines).

Additionally, the applicant states the need for the project as:

- Assist California in meeting its Renewable Portfolio Standard (RPS) goals of 20% of retail electric power sales by 2010 under existing law (Senate Bill 1078 – Chapter 516, Statutes of 2002).
- Support U.S. Secretary of the Interior Salazar's Order 3285 making the production, development and delivery of renewable energy top priorities for the United States.
- Support Governor Schwarzenegger's Executive Order S-14-08 to streamline California's renewable energy project approval process and to increase the State's Renewable Energy Standard to 33% renewable power by 2020.
- Support the greenhouse gas reduction goals of Assembly Bill 832 (California Global Warming Solutions Act of 2006).
- Sustain and stimulate the economy of Southern California by helping to ensure an adequate supply of renewable electrical energy, while creating additional

construction and operations employment and increased expenditures in many local businesses.

DOE PURPOSE AND NEED

The Applicant has applied to the Department of Energy (DOE) for a loan guarantee under Title XVII of the Energy Policy Act of 2005 (EPAct 05), as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, P.L. 111-5 (the "Recovery Act"). DOE is a cooperating agency on this EIS pursuant to an MOU between DOE and BLM signed in January 2010. The purpose and need for action by DOE is to comply with its mandate under EPAct by selecting eligible projects that meet the goals of the Act.

EPAct 2005 established a Federal loan guarantee program for eligible energy projects, and was amended by the Recovery Act to create Section 1705 authorizing a new program for rapid deployment of renewable energy projects and related manufacturing facilities, electric power transmission projects, and leading edge biofuels projects. The primary purposes of the Recovery Act are job preservation and creation, infrastructure investment, energy efficiency and science, assistance to the unemployed, and State and local fiscal stabilization. The Section 1705 Program is designed to address the current economic conditions of the nation, in part, through renewable energy, transmission and leading edge biofuels projects.

A.5 PROJECT EVALUATION AND APPROVAL PROCESS

This RSA contains staff's independent evaluation of the applicant's filings with the Energy Commission. The application filed with the Energy Commission is the Application for Certification (09-AFC-7). The RSA examines engineering, environmental, public health and safety aspects of the Palen Solar Power Project (PSPP), based on the information provided by the applicant and other sources available at the time the RSA was prepared.

BLM will publish their own separate FEIS where they will state their conclusions.

The decisions to be made by the agencies (licensing by the Energy Commission, and ROW grant by BLM) are independent of each other.

A.5.1 BLM EVALUATION AND APPROVAL PROCESS

The FEIS will include, for BLM, a Proposed Land Use Plan Amendment (Proposed PA). The NOA will initiate a 30-day period in which to protest the Proposed PA to the Director of the BLM. Following resolution of any protests BLM may then publish a Record of Decision (ROD) with respect to the plan amendment and the Project Application.

A.5.2 ENERGY COMMISSION EVALUATION AND APPROVAL PROCESS

The Energy Commission's siting regulations require Energy Commission staff to independently review the AFC and assess whether the list of environmental impacts

contained is complete and whether additional or more effective mitigation measures are necessary, feasible, and available (Cal. Code Regs., tit. 20, §§ 1742 and 1742.5(a)).

In addition, Energy Commission staff must assess the completeness and adequacy of the measures proposed by the applicant to ensure compliance with health and safety standards and the reliability of power plant operations (Cal. Code Regs., tit. 20, § 1743(b)). Energy Commission staff is required to develop a compliance plan (coordinated with other agencies) to ensure that applicable laws, ordinances, regulations, and standards are met (Cal. Code Regs., title 20, § 1744(b)).

Energy Commission staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act (CEQA). No additional Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the California Resources Agency as meeting all requirements of a certified regulatory program (Pub. Resources Code, § 21080.5 and Cal. Code Regs., title 14, § 15251 (j)).

Energy Commission staff's impact assessment, including the recommended conditions of certification, is only one piece of evidence that the Committee assigned to oversee the PSPP AFC will consider in reaching a decision on the proposed project and making its recommendation to the full Energy Commission. At the public evidentiary hearings, all parties will be afforded an opportunity to present evidence and to rebut the testimony of other parties, thereby creating a hearing record on which a decision on the project can be based. The hearing before the assigned Committee also allows all parties to argue their positions on disputed matters, if any, and it provides a forum for the Committee to receive comments from the public and other governmental agencies.

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Member's Proposed Decision (PMPD). Following its publication, the PMPD is circulated for 30 days in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. At the close of the comment period for either the PMPD or the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision.

A.5.3 JOINT NEPA/CEQA PROCESS

This section was deleted because it is no longer applicable.

A.5.4 AGENCY COORDINATION

The Energy Commission and BLM seek comments from and work closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies may include as applicable, the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State Water Resources Control Board/Regional Water Quality Control Board, State Historic Preservation Officer, California Department of Fish and Game, and the Mojave Desert Air Quality Management District. On December 21, 2009, the Energy Commission staff sent the PSPP AFC to all local, state, and federal agencies that might be affected by or have an interest in the proposed project.

Copies of the SA/DEIS were also provided to these same state and local agencies on March 23, 2010.

A.6 PUBLIC COORDINATION

Energy Commission regulations require staff to send notices regarding receipt of an AFC and Commission events and reports related to proposed projects, at a minimum, to property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines and water lines). This was done for PSPP on December 21, 2009.

Copies of the SA/DEIS were also provided on March 23, 2010.

The Bureau of Land Management and Energy Commission's outreach efforts are an ongoing process that, to date, has involved the following efforts:

BLM SCOPING MEETING

The Notice of Intent to prepare an environmental impact statement for this proposed project was published in the *Federal Register* on November 23, 2009. On December 11, 2009, BLM held its Scoping Meeting at the University of California-Riverside, Palm Desert Campus.

LIBRARIES

On December 21, 2009, the Energy Commission staff sent the PSPP AFC to the following libraries: Riverside Main Library, Palo Verde Valley District Library, Lake Tamarisk Library, Coachella Branch Library, and Cathedral City Branch Library.

In addition, to these local libraries, copies of the AFC are also available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, as well as, public libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco. On March 23, 2010, the Energy Commission provided these same libraries with a copy of the SA/DEIS.

Copies of the AFC were also provided to all state and local agencies that would have had permitting responsibilities except for the exclusive siting authority of the Energy Commission.

PUBLIC OUTREACH EFFORTS

The Energy Commission staff provided notification by letter and enclosed a notice of the January 25, 2010 Informational Hearing and Site Visit for PSPP, which included a joint presentation by the Energy Commission and the BLM. In addition to property owners and persons on the general project mail-out list, notification was provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project. Also, elected and certain appointed officials were similarly notified of the hearing and site visit.

DATA REQUEST AND DATA RESPONSE AND ISSUE RESOLUTION WORKSHOPS

The Energy Commission staff provided notification by letter and enclosed a notice of the December 9, 2009 Data Request Workshop and the January 7, 2010 Data Response and Issue Resolution Workshop to property owners and persons on the general project mail-out list. BLM attended these workshops held by Energy Commission. Notification was also provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project.

STAFF ASSESSMENT WORKSHOPS

The Energy Commission staff provided notification by letter and enclosed a notice of the April 16, 2010 Biological Workshop and the April 28 and 29 Staff Assessment Workshop to property owners and persons on the general project mail-out list. In addition, the April 28 and 29 Workshop was continued to May 7, 2010.

BLM attended these workshops held by Energy Commission. Notification was also provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project.

NOTIFICATION TO THE LOCAL NATIVE AMERICAN COMMUNITY

On December 9, 2009, December 21, 2009, January 7, 2010, and March 23, 2010 the Energy Commission sent mail-outs regarding the project to the Native American Heritage Commission.

The BLM has notified affected Indian Tribes regarding the proposed project, has sought their comments, and has invited them to consult on the project on a government-to government basis. The affected Indian Tribes are currently working with the BLM.

ENERGY COMMISSION'S PUBLIC ADVISER'S OFFICE

The Public Adviser helps the public participate in the Energy Commission's hearings and meetings. The Public Adviser assists the public by advising them how they can participate in the Energy Commission process; however, the Public Adviser does not represent members of the public. The Public Adviser's Office attended and presented information at the January 25, 2010 Informational Hearing and Site Visit.

A.7 ALTERNATIVES DISCUSSION

The Alternatives discussion will be included in Part II of the RSA, which is expected to be published in mid-September.

A.8 SCOPING AND SA/DEIS COMMENTS

Scoping and SA/DEIS Comments will be included in Part II of the RSA, which is expected to be published in mid-September.

A.9 REFERENCES

Solar Millennium2009a. Solar Millennium (tn: 52939). Application for Certification Vol 1 & 2, dated 8/24/2009.

Solar Millennium2009b. Solar Millennium (tn: 54008). Data Adequacy Supplement, dated 10/26/2009.

Solar Millennium2010b. Solar Millennium, (tn: 55131). Data Responses for Palen Solar 1, dated 1/22/2010.

Solar Millennium2010l. Solar Millennium, (tn: 57442). Applicant's Supplementary Information - Reconfigured Alternative 2 & Reconfigured Alternative 3, Bio Resources, dated 7/2/2010.

Galati & Blek2010i. Galati & Blek LLP (tn: 56542). Applicant's Initial Comments on the SA-DEIS, dated 5/4/2010.

B. DESCRIPTION OF THE PROPOSED PROJECT AND ALTERNATIVES

B.1 - DESCRIPTION OF THE PROPOSED PROJECT

Testimony of Alan Solomon

B.1.1 INTRODUCTION

On August 24, 2009, the California Energy Commission received an Application For Certification (AFC) from Palen Solar I[1] (applicant) to construct and operate the Palen Solar Power Project (PSPP) in Riverside County. On October 26, 2009, a Supplement to the AFC was received and evaluated by staff. Subsequently, at the Energy Commission's November 18, 2009 Business Meeting, the AFC was deemed complete, beginning staff's analysis of the proposed project.

The proposed project site includes one privately-owned 40-acre parcel, which has been incorporated into the proposed eastern solar field. The remainder of the PSPP facilities would be entirely on Federal land. The applicant is seeking a right-of-way grant for approximately 5,200 acres of land administered by the Bureau of Land Management (BLM). The disturbance area for construction and operation of the project is currently about 2,970 acres, and does not include the final transmission line, temporary construction power line and telecommunications line.

The SA/DEIS analyzed the proposed project, Reconfigured Alternative #1, and Reduced Acreage Alternative. In their analysis, Energy Commission Staff found that the proposed project and the Reconfigured Alternative #1 would have had substantial impacts to biological resources. Staff was particularly concerned about the biological impacts to the Mojave fringe-toed lizard and the sand transport corridor. The applicant stated that the Reduced Acreage Alternative was not economically feasible.

The applicant disagrees that the project as originally proposed would result in unmitigable significant adverse impacts to biological resources; however, in an effort to accommodate staff's and the other biological agencies' concerns, the applicant developed and submitted for consideration two other site configuration alternatives: Reconfigured Alternative #2 and Reconfigured Alternative #3.

The key difference between Reconfigured Alternative #2 and Reconfigured Alternative #3 is the use of the private land near the south-east corner of the PSPP. The applicant is currently discussing the possibility of purchasing this private land with the landowners. Therefore, the applicant has requested, and staff concurs, that the Committee consider both Alternative #2 and Alternative #3 for certification. The outcome of the discussions between the applicant and landowners will determine which project the applicant will develop.

B.1.2 DESCRIPTION

PSPP would consist of two adjacent, independent, and identical units of 250 megawatt (MW) nominal capacity each for a total nominal capacity of 500 MW.

[1]Chevron Energy Solutions and Solar Millennium have a joint development agreement. Chevron Energy Solutions applied for the Right of Way for Palen Solar Power Project. To facilitate the permitting of the Palen Solar Power Project (PSPP), the Applicant is requesting that the CEC issue one License to a Project- specific company. The company for PSPP is Palen Solar I, LLC a wholly owned subsidiary of Solar Millennium and the single Applicant for the PSPP.

The proposed project would utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola. A heat transfer fluid (HTF) is heated to high temperature (750°F) as it circulates through the receiver tubes. The heated HTF is then piped through a series of heat exchangers where it releases its stored heat to generate high pressure steam. The steam is then fed to a traditional steam turbine generator where electricity is produced.

Each of the two solar field systems operates under the control of its Field Supervisor Controller (FSC), which is a computer located at each plant's control room.

The FSC collects information from each Solar Collector Assembly (SCA) and issues instructions to the SCA's. Its functions include deploying the solar field during the day when weather and facility availability permit, and stowing it at night and during high winds (in high wind conditions, the solar field must be stowed).

A weather station located in each power block provides real-time measurements of weather conditions that affect the solar field operation. Radiation data is used to determine the performance of the solar field.

The FSC communicates all relevant conditions to the plant's distributed control system (DCS). The DCS coordinates and integrates power block, HTF system, and solar field operation.

B.1.2.1 INDIVIDUAL COMPONENTS OF THE PROPOSED PROJECT

Solar Collector Assemblies - The project's SCAs are oriented north-south to rotate east-west to track the sun as it moves across the sky throughout the day. The SCAs collect heat by means of linear troughs of parabolic reflectors, which focus sunlight onto a straight line of heat collection elements (HCEs) welded along the focus of the parabolic "trough".

Parabolic Trough Collector Loop - Each of the collector loops consist of two adjacent rows of SCAs, each row is about 1,300 feet long. The two rows are connected by a crossover pipe. HTF is heated in the loop and enters the header, which returns hot HTF from all loops to the power block where the power generating equipment is located.

Mirrors - The parabolic mirrors to be used in the Project are low-iron glass mirrors. Typical life spans of the reflective mirrors are expected to be 30 years or more.

Heat Collection Elements - The HCEs of the two solar plants are comprised of a steel tube surrounded by an evacuated glass tube insulator. The steel tube has a coated surface, which enhances its heat transfer properties with a high absorptivity for direct solar radiation, accompanied by low emissivity.

Glass-to-metal seals and metal bellows are incorporated into the HCE to ensure a vacuum-tight enclosure. The enclosure protects the coated surface and reduces heat losses by acting as an insulator.

HTF System - In addition to the HTF piping in the solar field, each of the two HTF systems includes three elements: 1) the HTF heat exchanger, (2) the HTF expansion

vessel and overflow vessel, and 3) the HTF ullage system. Rather than a fired HTF heater, a heat exchanger would be installed to assist in ensuring system temperature stays above 54ºF (12ºC). The HTF heat exchanger is an unfired unit that utilizes steam from the auxiliary boiler as the heating medium. The HTF expansion and overflow vessel are required to accommodate the volumetric change that occurs when heating the HTF to the operating temperature.

During plant operation, HTF would degrade into components of high and low boilers (substances with high and low boiling points). The low boilers are removed from the process through the ullage system. HTF is removed from the HTF surge tank and flashed, leaving behind high boilers and residual HTF. The flashed vapors are condensed and collected in the ullage system.

Solar Steam Generator System - At each of the two units, the SSG system transfers the sensible heat from the HTF to the feedwater. The steam generated in the SSG is piped to a Rankine-cycle reheat steam turbine. Heat exchangers are included as part of the SSG system to preheat and boil the condensate, superheat the steam, and reheat the steam.

Steam Turbine Generator - The STG receives steam from the SSG. The steam expands through the STG turbine blades to drive the steam turbine, which then drives the generator, converting mechanical energy to electrical energy. Each of the Project's STGs would be a three-stage casing type with high pressure (HP) intermediate pressure (IP), and low pressure (LP) steam sections. The STG is equipped with the following accessories:

- Steam stop and control valves,
- Gland seal system,
- Lubricating and jacking oil systems,
- Thermal insulation, and
- Control instrumentation.

Operation of the Solar Fields

At each solar field, a DCS containing several automation units controls the HTF and steam loops and all auxiliary plant systems, and determines the appropriate operating sequences for them. It also monitors and records the primary operating parameters and functions as the primary interface for system control.

The DCS communicates with all subsystem controls, including electrical system equipment, steam cycle controllers, variable frequency drives and balance-of-plant system controllers via serial data communication. It receives analog and digital inputs/outputs from all instruments and equipment not served directly by dedicated local controllers. The DCS controls both the steam and HTF cycles directly, operating rotating equipment via relevant electrical panels. It includes a graphical user interface at an operator console in the main control room. Day-to-day, the following operation modes would occur in the HTF system:

- Warm up,

- Solar field mode (heat transfer from solar field to power block),
- Shutdown, and
- Freeze protection.

Warm up

Usually in the morning, the warm up mode brings the HTF flow rate and temperatures up to their steady state operating conditions. It does this by positioning all required valves, starting the required number of HTF main pumps for establishing a minimum flow within the solar field and tracking the solar field collectors into the sun.

At the beginning of warm up at each of the units, HTF is circulated through a bypass around the power block heat exchangers until the outlet temperature reaches the residual steam temperature in the heat exchangers. HTF is then circulated through the heat exchangers and the bypass is closed. As the HTF temperature at the solar field outlet continues to rise, steam pressure builds up in the heat exchangers until the minimum turbine inlet conditions are reached, upon which the turbine can be started and run up to speed. The turbine is synchronized and loaded according to the design specification until its power output matches the full steady state solar field thermal output.

Solar Field Control Mode

The DCS enters solar field control mode automatically after completing warm-up mode. It regulates the flow by controlling the HTF main pump speeds to maintain the design solar field outlet temperature.

HTF pumps would generally be operated in parallel, at the speed required to provide the required flow in the field. If the thermal output of the solar field is higher than the design capacity of the steam generation system, collectors within the solar field are de-focused to maintain design operating temperatures.

Shutdown

If the minimal thermal input to the turbine required by the project's operating strategy cannot be met under the prevalent weather conditions, then shutdown is indicated. Operators would track all solar collectors into the stow position, reduce the number of HTF main pumps to a minimum, and stop the HTF flow to the power block heat exchangers.

HTF Freeze Protection

At each unit, a freeze protection system would be used to prevent freezing of the HTF piping systems when the solar plant is shut down. Since the HTF freezes at a relatively high temperature (54°F or 12°C), HTF would be routinely circulated at low flow rates throughout the solar field using hot HTF from the storage vessel as a source. This circulation of the warm HTF overnight typically provides adequate freeze protection. During those few of the coldest winter nights where circulation alone is insufficient to provide adequate freeze protection, the auxiliary boiler, which will typically run at 25% capacity overnight to provide steam for the STG steam seals, will be utilized at 100% capacity to provide steam to an HTF heat exchanger to further heat the HTF.

Major Project Components

The major components and features of the proposed project include:

- Power Block Unit #1 (east);
- Power Block Unit #2 (west);
- Access road from existing I-10 Corn Springs Road exit to onsite office;
- Office and parking;
- Land Treatment Unit (LTU) for bioremediation/land farming of HTF-contaminated soil;
- Warehouse/maintenance building and laydown area;
- Onsite transmission facilities, including central internal switchyard;
- Dry wash rerouting; and
- Groundwater wells used for water supply.

The two power blocks are identical in design. The descriptions below apply to power blocks in both units. Major components of each power block include:

- Steam generation heat exchangers;
- HTF overflow and expansion vessels;
- One HTF freeze protection heat exchanger
- One auxiliary boiler;
- One steam turbine-generator (STG);
- One generator step up transformer (GSU);
- Air Cooled Condenser (ACC);
- One wet cooling tower for ancillary equipment;
- Water filter system and clarifier system;
- Combination firewater/clarified water tank;
- Reverse Osmosis (RO) reject water surge tank;
- Potable water system;
- Demineralized Water System;
- Demineralized Water Tank;
- High pH Reverse Osmosis (HERO) waste water recovery system;
- Recoverd water surge tank
- Evaporation waste stream pond(s)
- Water and HTF pipelines exiting the power block;
- One above ground, propane storage tank;

- Operations and maintenance buildings; and
- Transmission and telecommunications lines exiting the power block.

Fuel Supply and Use

The auxiliary boiler would be fueled by propane. Propane would be delivered to the plant site via truck from a local distributor and stored in 18,000-gallon above ground tanks (one in each power block). The estimated propane usage per unit for normal operations is 8 MMBtu/hr overnight and 34 MMBtu/hr for one half-hour during startup each morning. The boiler will run at 100% load overnight when supplemental HTF freeze protection is needed, which is estimated at 100 hours per year.

Water Supply and Use

The project would be dry cooled. The project's primary water uses include solar mirror washing, feedwater makeup, fire water supply, onsite domestic use, and cooling water for auxiliary equipment, heat rejection.

Water Requirements

The average water requirement for each of the two power plants is estimated to be about 150 acre feet per year (afy) for a total of 300 afy, which corresponds to an average flow rate of about 188 gallons per minute (gpm), based on pumping 24 hours per day, 350 days per year. Usage rates during operation would vary during the year and would be higher in the summer months when the peak maximum flow rate could be as much as about 50% higher (about 275 gpm).

Water Source and Quality

The project water needs would be met by use of groundwater pumped from up to ten wells on the plant site. Water for domestic uses by project employees would also be provided by onsite groundwater treated to potable water standards.

It is expected that new water supply wells in the project site would adequately serve the entire project. Multiple wells would provide redundancy and backup water supply in the event of outages or maintenance of one or more of the other wells.

Solar Mirror Washing Water

At each solar field, to facilitate dust and contaminant removal, water from the demineralization process would be sprayed on the solar collectors for cleaning. The collectors would be cleaned once or twice per week, determined by the reflectivity monitoring program. This mirror washing operation would be done at night and involves a water truck spraying treated water on the mirrors in a drive-by fashion. The applicant expects that the mirrors would be washed weekly in winter and twice weekly from mid spring through mid fall. Because the mirrors are angled down for washing, water does not accumulate on the mirrors; instead, it would fall from the mirrors to the ground and, due to the small volume, is expected to soak in with no appreciable runoff. Any remaining rinse water from the washing operation would be expected to evaporate on the mirror surface. The treated water production facilities would be sized to accommodate the solar mirror washing demand of about 114 afy.

Cooling Systems

The power plant includes two cooling systems: 1) the air-cooled steam cycle heat rejection system and, 2) the closed cooling water system for ancillary equipment cooling:

Steam Cycle Heat Rejection System

The cooling system for heat rejection from the steam cycle consists of a forced draft air-cooled condenser, or dry cooling system. At each power block, the dry cooling system receives exhaust steam from the LP section of the STG and condenses it to liquid for return to the SSG.

Auxiliary Cooling Water System

The auxiliary cooling water systems uses a wet cooling tower for cooling plant equipment, including the STG lubrication oil cooler, the STG generator cooler, steam cycle sample coolers, large pumps, etc. The water is warmed by the various equipment items being cooled and rejects the heat to the cooling tower. This auxiliary cooling system would allow critical equipment such as the generator and HTF pumps to operate at their design ratings during hot summer months when the project's power output is most valuable. An average of 73,000 gallons of water per day (82 afy) would be consumed by the auxiliary cooling water system; the maximum rate of consumption is 112,000 gallons per day in summer.

Waste Generation and Management

Project wastes would be comprised of non-hazardous wastes including solids and liquids and lesser amounts of hazardous wastes and universal wastes. The non-hazardous solid waste primarily would consist of construction and office wastes, as well as liquid and solid wastes from the water treatment system. The non-hazardous solid wastes would be trucked to the nearest Class II or III landfill. Non-hazardous liquid wastes would consist primarily of domestic sewage and waste water streams such as RO system reject water, boiler blowdown, and auxiliary cooling tower blowdown. A septic tank and leach field system would be installed to manage domestic sewage. All other waste streams will be either recycled or sent to the evaporation pond(s).

Wastewater

The PSPP would produce four primary wastewater streams:

- Non-reusable sanitary wastewater produced from administrative centers and operator stations.
- Non-reusable cooling tower blowdown
- Partially recyclable boiler blowdown (to be used as cooling tower makeup)
- Reusable RO and demineralized reject water that will be sent to a HERO type system, or concentrated to minimize waste streams to the evaporation ponds.

Sanitary wastewater production is based on domestic water use. Maximum domestic water use is expected to be less than 166,000 gallons per month (5,500 gallons per

day). It is anticipated that the wastewater would be consistent with domestic sanitary wastewater and would have Biological Oxygen Demand and Total Suspended Solids in the range of 150 to 250 mg/L.

Wastewater Treatment

Sanitary wastes would be collected for treatment in septic tanks and disposed via leach fields located at the two power blocks as well as at the administration and warehouse areas. Smaller septic systems would be provided for the control room buildings to receive sanitary wastes at those locations. Based on the current estimate of 5,500 gallons of sanitary wastewater production per day, a total leach field area of approximately 11,000 square feet would be required spread out among three or more locations.

In a typical wet cooled power plant, water is cycled in the cooling tower until the concentration of chemical constituents rises to levels where it becomes unusable (e.g. typically five to ten cycles of concentration) and it is blown down as a waste stream. Dilute waste streams such as boiler blow downs and some RO concentrates may be fed to the cooling tower and further concentrated; this design practice helps reduce the total waste water flow that then must be sent to an evaporation pond or other treatment system. While dry cooling the power cycle significantly reduces the overall water usage of a plant, it eliminates the cooling tower recycle option that helps minimize waste flows from the remaining water processes. The auxiliary wet cooling tower is too small to concentrate the remaining water flows.

The three plant waste water streams, cooling tower blowdown, boiler blow down, and RO/ Demineralizer water rejects will be recycled as much as possible to the High pH Reverse Osmosis system for recovery. The HERO system will recover 70% or more (depending on water quality) of this waste stream and greatly limit the size of the required evaporation pond. Some waste water sources such as cooling tower blowdown or boiler blowdown in certain cases may not be able to be recovered in the HERO system and would be sent directly to the evaporation pond.

The waste water system will require two 4 acre evaporation ponds per power block. Two ponds were selected for reliability. The plant will operate using one pond for approximately 24 months, and then switch the second pond. Approximately 18 months is required for one pond to evaporate and be ready for use again. If a pond requires maintenance or solids removal, the plant can still operate with the other pond. The evaporation ponds will be double-lined and covered with narrow-mesh netting to prevent access by ravens and migratory birds in accordance with applicable regulations.

Construction Wastewater

Sanitary wastes produced during construction would be held in chemical toilets and transported offsite for disposal by a commercial chemical toilet service. Any other hazardous wastewater produced during construction such as equipment rinse water would be collected by the construction contractor in Baker tanks and transported off site for disposal in a manner consistent with applicable regulatory requirements.

On-Site Land Treatment Unit

The two solar fields to be installed at the Project would require LTUs to bioremediate or land farm soil contaminated from releases of HTF. The bioremediation unit would be designed in accordance with Colorado River Basin Regional Water Quality Control Board (RWQCB) requirements and is expected to comprise an area of about 4 acres per solar plant, or 8 acres total. The bioremediation facility would utilize indigenous bacteria to metabolize hydrocarbons contained in non-hazardous HTF contaminated soil. A combination of nutrients, water, and aeration facilitates the bacterial activity where microbes restore contaminated soil within 2 to 4 months. The California Department of Toxic Substances Control (DTSC) has determined for a similar thermal solar power plant that soil contaminated with up to 10,000 mg/kg of HTF is classified as a non-hazardous waste. However, the DTSC has further indicated that site-specific data would be required to provide a classification of the waste. Soil contaminated with HTF levels of between 100 and 1,000 mg/kg would be land farmed at the LTU, meaning that the soil would be aerated but no nutrients would be added.

Other Non-Hazardous Solid Waste

Non-hazardous solid wastes may be generated by construction, operation, and maintenance of the project which are typical of power generation facilities. These wastes may include scrap metal, plastic, insulation material, glass, paper, empty containers, and other solid wastes. Disposal of these wastes would be accomplished by contracted solid refuse collection and recycling services.

Hazardous Solid and Liquid Waste

Limited hazardous wastes would be generated during construction and operation. During construction, these wastes may include substances such as paint and paint-related wastes (e.g., primer, paint thinner, and other solvents), equipment cleaning wastes and spent batteries. During project operation, these wastes may include used oils, hydraulic fluids, greases, filters, spent cleaning solutions, spent batteries, and spent activated carbon. Both construction and operation-phase hazardous waste would be recycled and reused to the maximum extent possible. All wastes that cannot be recycled and any waste remaining after recycling would be disposed of in accordance with all applicable laws, ordinances, regulations and standards (LORS).

Hazardous Materials Management

There would be a variety of hazardous materials used and stored during construction and operation of the project. Hazardous materials that would be used during construction include gasoline, diesel fuel, oil, lubricants, and small quantities of solvents and paints. All hazardous materials used during construction and operation would be stored onsite in storage tanks/vessels/containers that are specifically designed for the characteristics of the materials to be stored; as appropriate, the storage facilities would include the needed secondary containment in case of tank/vessel failure. Aboveground carbon steel tanks (300 gallons) also would be used to store diesel fuel at each power block. Secondary containment would be provided for these tanks.

Fire Protection

Fire protection systems are provided to limit personnel injury, property loss, and project downtime resulting from a fire. The systems include a fire protection water system, foam

generators, carbon dioxide fire protection systems, and portable fire extinguishers. The location of the project is such that it would fall under the jurisdiction of the Riverside County Fire Department.

Firewater would be supplied from the one million-gallon clarified water storage tanks located at each of the two power blocks on the site. One electric and one diesel- fueled backup firewater pump, each with a capacity of 5,000 gpm, would deliver water to the fire protection piping network.

The piping network would be configured in a loop so that a piping failure can be quickly isolated with shutoff valves without interrupting water supply to other areas in the loop. Fire hydrants would be placed at intervals throughout the project site that would be supplied with water from the supply loop. The water supply loop would also supply firewater to a sprinkler deluge system at each unit transformer, HTF expansion tank and circulating pump area and sprinkler systems at the steam turbine generator and in the administration building. Fire protection for each solar field would be provided by zoned isolation of the HTF lines in the event of a rupture that results in a fire.

Telecommunications and Telemetry

The project would have telecommunications service from the telecommunications service provider who serves the Desert Center area. Voice and data communications would be provided by a new twisted pair telecommunications cable. The routing for this cable will follow the routing of the redundant telecommunications line from the project to the Red Bluff Substation. The routing for both of these lines will exit the project site in the right-of-way for the site access road, cross under I-10 west of the Corn Springs Road interchange and proceed to the microwave repeating tower approximately 700 feet south of the freeway. The routing of the redundant telecommunications line to the SCE Red Bluff Substation will then be hung on the existing 12.47 kV SCE line that feeds the microwave tower and carried- to the Red Bluff Substation. Wireless telecom equipment will be used to support communication with staff dispersed throughout the project site. The project would utilize electronic telemetry systems to control equipment and facilities operations for the site.

Lighting System

The project's lighting system would provide operations and maintenance personnel with illumination in normal and emergency conditions. AC lighting would be the primary form of illumination, but DC lighting would be included for activities or emergency egress required during an outage of the plant's AC system.

HTF Leak Detection

Leak detection of HTF would be accomplished in various ways. Visual inspection throughout the solar field on a daily basis would detect leaks occurring at ball joints or other connections. Additionally, the configuration of the looped system allows different sections of the loops to be isolated. Isolation valves will be installed such that each HTF loop section can be contained in the unlikely event of a major rupture in the HTF piping.

Detection of large leaks is being proposed by using remote pressure sensing equipment and remotely-actuated valves to allow for isolation of large sections of the large-bore header piping in the solar field.

Water Storage Tanks

In each power block there would be two major covered water tanks: one 1,000,000-gallon Service/Fire Water storage tank and one 120,000-gallon Demineralized Water storage tank. A much smaller RO Reject water tank would also be provided. Several other small water system surge tanks will also be installed in between various steps in the water treatment process. Water storage tanks would be vertical, cylindrical, field-erected steel tanks supported on foundations consisting of either a reinforced concrete mat or a reinforced concrete ring wall with an interior bearing layer of compacted sand supporting the tank bottom.

Roads, Fencing, and Security

There is an existing highway exit near the southwest boundary of the proposed project site. Access to the project would be via a new, 24-foot wide paved access road starting at the existing Corn Springs Road north of I-10. It is anticipated that no improvements to I-10 would be needed.

Only a small portion of the overall plant site would be paved, primarily the site access road, the service roads to the power blocks, and portions of the power block (paved parking lot and roads encircling the STG and SSG areas). The remaining portions of the power block would be gravel surfaced. In total, the power block would be approximately 18.4 acres with approximately 6 acres of paved area. The solar field would remain unpaved and without a gravel surface in order to prevent rock damage from mirror wash vehicle traffic; an approved dust suppression coating would be used on the dirt roadways within and around the solar field. Roads and parking areas located within the power block area and adjacent to the administration building and warehouse would be paved with asphalt.

The project solar field and support facilities perimeter would be secured with a combination of chain link and wind fencing. Chain link metal-fabric security fencing, 8 feet tall, with one-foot barbed wire or razor wire on top would be installed along the north and south sides of the facilities. Thirty-foot tall wind fencing, comprised of A-frames and wire mesh, would be installed along the east and west sides of each solar field. Tortoise exclusion fencing would be included. Controlled access gates would be located at the site entrance. The proposed drainage channels would be outside the plant facilities and the security fencing but still within the project ROW.

Drainage and Earthwork

The existing topographic conditions of the Project plant site show an average slope of approximately one foot in 75 feet (1.33%) toward the northeast.

The applicant filed a Streambed Alteration Agreement for the purposes of altering the terrain and installing channels. This application is currently being reviewed.

B.1.3 CONSTRUCTION

Project construction is expected to occur over a total of 39 months. Project construction would require an average of 566 employees over the entire 39-month construction period, with manpower requirements peaking at approximately 1,140 workers in Month

17 of construction. The construction workforce would consist of a range of laborers, craftsmen, supervisory personnel, support personnel, and management personnel.

Temporary construction parking areas would be provided within the power plant site adjacent to the laydown area. The plant laydown area would be utilized throughout the build out of the two solar units. The construction sequence for power plant construction includes the following general steps:

- *Site Preparation:* this includes detailed construction surveys, mobilization of construction staff, grading, and preparation of drainage features. Grading for the solar field, power block, and drainage channels would be completed during the first 24 months of the construction schedule.
- *Linears:* this includes the site access road, telecommunication line, temporary construction power line and transmission line. The site access road and telecommunication line would be *constructed* during the first 6 months of the construction schedule in conjunction with plant site preparation activities. The transmission and telecommunications lines would be constructed during the first 18 months of the construction schedule.
- *Foundations:* this includes excavations for large equipment (ACC, STG, SSG, GSU, etc.), footings for the solar field, and ancillary foundations in the power block.
- *Major Equipment Installation:* once the foundations are complete the larger *equipment* would be installed. The solar field components would be assembled in an onsite erection facility and installed on their foundations.

B.1.3.1 CONSTRUCTION WATER

Construction water requirements cover all construction related activities including:

- Dust control for areas experiencing construction work as well as mobilization and demobilization,
- Dust control for roadways,
- Water for grading activities associated with both cut and fill work,
- Water for soil compaction in the utility and infrastructure trenches,
- Water for soil compaction of the site grading activities,
- Water for stockpile sites,
- Water for the various building pads, and
- Water for concrete pours on site.
- Concrete batch plant operations

The predominant use of water would be for grading activities. Average water use at the site is estimated to be about 1,619,899 gallons (about 4.97 acre-feet) per calendar day. Total construction water use for the duration of the Project is estimated to be about 5,750 acre-feet. Construction water would be sourced from onsite wells. Potable water during construction would be brought onsite in trucks and held in day tanks.

B.1.3.2 CONCRETE BATCH PLANT

With the estimated concrete volume of approximately 125,000 cubic yards per solar plant, an onsite batch would be utilized to provide concrete for the solar fields and power block foundations and pads. The batch plant would have a production capacity of 150 cubic yards per hour and operate 10 hours per day, 5 days a week. Night operation of the batch plant will likely be required to overcome the difficulty of performing concrete placement in extremely high ambient temperatures. It would consist of a series of storage bins and piles, conveyors, mixers, ice storage and chipper, and would include a 75 kW power supply (with diesel generator if needed) and provision for dust control. Concrete would be transported from the batch plant to the placement area via a fleet of 8 concrete trucks. The batch plant would be movable and would be deployed to the current area of work at the power blocks or main warehouse area.

B.1.3.3 FUEL DEPOT

A fuel depot would be constructed to refuel, maintain, and wash construction vehicles, and would occupy an area of approximately 75 feet x 150 feet. It would consist of a fuel farm with two each 2000-gallon on-road vehicle diesel tanks, two 8,000-gallon off-road vehicle diesel tanks, one 500-gallon gasoline tank, and a wash water holding tank. The fuel farm would include secondary spill containment, a covered maintenance area, also with secondary containment, and a concrete pad for washing vehicles.

B.1.3.4 CONSTRUCTION POWER

Construction power will be provided to the site by Southern California Edison (SCE). Two alternative sources of construction power are being investigated. Both sources feed from the 12.47 kV distribution system in Desert Center on Rice Road. The first alternative would be a new 12.47 kV line built within the 161 kV right-of-way from Rice Road down to the project site. The second alternative, would be a new 12.47 kV line built within the surveyed 230 kV transmission line right-of-way from Rice Road back to the project site. This line would be built as a combination of new 12.47 line or hung on the new 230 kV transmission line towers that bring the single circuit 230 kV line back to the project site. The project will include construction of a 12.47 kV internal distribution system and step down transformers to provide power as needed to construction operations.

B.1.4 OPERATION AND MAINTENANCE

While electrical power is to be generated only during daylight hours, PSPP would be staffed 24 hours a day, 7 days per week. A total estimated workforce of 134 full time employees would be needed with both units operating.

B.1.4.1 TRANSMISSION SYSTEM

The PSPP facility would be connected to the SCE transmission system at SCE's new Red Bluff substation. Currently, there are two locations proposed by SCE for the substation. The new single circuit, 230 kV generation tie line from PSPP to the proposed substation will be approximately 7.5 miles to the south on BLM land.

B.1.4.2 TRANSMISSION LINE ROUTE

The single circuit 230 kV generation tie line will exit the northwest corner of the PSPP and travel west and south through BLM lands crossing the I-10 and proceeding south into SCE's planned Red Bluff substation. A map is attached showing the gen-tie route to both the possible locations of Red Bluff.

B.1.4.3 EXISTING SCE DISTRIBUTION LINE

There is an existing Southern California Edison 161-kV Eagle Mountain-Blythe power line which runs in a northwesterly direction across the southwest portion of the proposed project site. The applicant is working with SCE to relocate the SCE line within the BLM ROW.

B.1.5 CLOSURE, DECOMMISSIONING AND RESTORATION

The planned operational life of the project is 30 years, but the facility conceivably could operate for a longer or shorter period depending on economic or other circumstances. If the project remains economically viable, it could operate for more than 30 years. However, if the facility were to become economically non-viable before 30 years of operation, permanent closure could occur sooner. In any case, a Closure, Decommissioning and Restoration Plan would be prepared and put into effect when permanent closure occurs.

The procedures provided in the decommissioning plan would be developed to ensure compliance with applicable LORS, and to ensure public health and safety and protection of the environment. The Decommissioning Plan would be submitted to the CEC and BLM for review and approval prior to a planned closure.

B.2 – ALTERNATIVES EVALUATED

Testimony of Susan V. Lee

B.2.1 SUMMARY OF CONCLUSIONS

In this analysis of the Palen Solar Power Project, 24 alternatives to the project have been developed and evaluated. These include five alternative site locations or configurations, a range of different solar and renewable technologies, generation technologies using different fuels, and conservation/demand-side management. Of the 24 alternatives, five alternatives were determined to be potentially feasible by the Energy Commission and appeared to have the potential to substantially reduce one or more of the project's significant impacts. These alternatives are: the Reconfigured Alternative, Reconfigured Alternative #2, Reconfigured Alternative #3, and the Reduced Acreage Alternative. In addition to the proposed action and the potentially feasible alternatives, staff considered the No Project Alternative.

Each of the three reconfigured alternatives is a different 500 MW project, but the alternatives arrange the solar troughs in different ways to avoid different portions of the valuable sand transport corridor. The impacts of these three alternatives are analyzed in each discipline's analysis in Sections C and D.

The Reconfigured Alternative was defined December, 2009 by Palen Solar I, LLC (the Applicant) in response to a staff data request. It would have the same generation capacity as the 500 MW proposed project, and was found to have impacts similar to the proposed project for most resource elements. Due to its modified shape and avoidance of desert washes, the Reconfigured Alternative would eliminate the proposed project's significant unmitigable impacts to a wildlife movement corridor. However, the Reconfigured Alternative would not avoid the significant impacts to the sand transport corridor, sand dune habitat, and Mojave fringe-toed lizard. Significant impacts to land use would also remain with the Reconfigured Alternative, and the significant visual impacts of the proposed project would increase slightly with this alternative.

Reconfigured Alternative #2 was defined in June 2010 by the Applicant in response to staff concerns that the first Reconfigured Alternative would not eliminate significant impacts to the Mojave fringe-toed lizard, sand dune habitat and sand transport corridor. The Reconfigured Alternative #2 would generate 500 MW like the proposed project, and was found to have impacts similar to the proposed project for most resource elements. Significant impacts to land use would remain with the Reconfigured Alternative #2, and the significant visual impacts of the proposed project would increase slightly with this alternative due to its greater proximity to the Interstate 10. Due to its modified shape, the Reconfigured Alternative #2 appears to reduce impacts to Mojave fringe toed lizards, sand dune habitat, and the sand transport corridor. However, the conclusions of the biological analysis are necessary to confirm the extent to which these impacts are reduced. Reconfigured Alternative #2 appears to be a feasible alternative and at this time appears to be preferred to the proposed project.

Reconfigured Alternative #3 was also defined in June 2010 by the Applicant in response to concerns regarding the Mojave fringe-toed lizard, sand dune habitat and sand transport corridor. It would be similar to the Reconfigured Alternative #2 but would not

require use of private land not currently controlled by the Applicant. It would have the same generation capacity as the proposed project and was found to have impacts similar to the proposed project for most resource elements. Significant impacts to land use would remain with the Reconfigured Alternative #3, and the significant visual impacts of the proposed project would increase slightly with this alternative. Due to its modified shape, the Reconfigured Alternative #3 also appears to reduce impacts to Mojave fringe toed lizards, sand dune habitat, and the sand transport corridor. However, the conclusions of the biological analysis are necessary to confirm the extent to which these impacts are reduced. Reconfigured Alternative #3 appears to be a feasible alternative and at this time appears to be preferred to the proposed project.

The Reduced Acreage Alternative would generate 375 MW (75% as large as the proposed project). Staff developed this alternative to eliminate the two portions of the Reconfigured Alternative that created significant and unmitigable impacts: the sand transport corridor in the northern and northeastern portions of the right-of-way area and the Critical Habitat for desert tortoise in the southwestern corner of the right-of-way area. This alternative also adds solar field areas in an attempt to minimize the loss of generating capacity. The Reduced Acreage Alternative was found to reduce many of the impacts of the proposed PSPP. It would eliminate the unmitigable significant impacts to the sand transport corridor, to the Mojave fringe-toed lizard, and to the primary desert dry wash wildlife corridor. It would result in approximately 299 acres of direct impacts to dunes within sand transport corridor and 292 acres of indirect impacts to the sand transport corridor (sand shadow). With staff's proposed Conditions of Certification, the Reduced Acreage Alternative would result in impacts to all other biological resources being less than significant. However, the Reduced Acreage Alternative would slightly increase the significant visual impacts as compared with the proposed project. The Reduced Acreage Alternative is considered to be potentially feasible, as solar thermal facilities of 375 MW and smaller are currently proposed in California. However, no studies have been done to evaluate its economic feasibility.

CEC staff has determined that the No Project Alternative is not superior to the proposed project because it would likely delay development of renewable resources or shift renewable development to other similar areas, and could lead to increased operation of existing power plants that use non-renewable technologies.

The Desert Center Alternative would be located on private land and would have impacts similar to those of the proposed site in many resource elements. However, because this alternative would be on disturbed agricultural lands, it is likely to have less severe biological resources and cultural resources impacts. The Desert Center Alternative is made up of approximately 151 parcels with 40 separate landowners. The alternative is potentially feasible; however, due to the number of parcels that would have to be acquired obtaining site control would be more challenging at this site than at the proposed site, where the BLM is the only land management entity.

Alternative solar thermal technologies (Stirling engine, solar power tower, utility scale solar photovoltaics, and linear Fresnel) that could be used at the proposed site are also evaluated. As compared with the proposed solar trough technology, most of these

technologies would not substantially reduce one or more of the project's significant impacts including to visual resources, biological resources and cultural resources, as all require extensive acreage. Water use varies among the technologies.

Distributed solar photovoltaic facilities would likewise require extensive acreage, although it can also be installed on existing buildings and closer to urban areas, minimizing the loss of undisturbed open space and the need for transmission lines. However, increased deployment of distributed solar photovoltaics faces challenges in manufacturing capacity, cost, and policy implementation.

Other generation technologies (wind, geothermal, biomass, tidal, wave, natural gas, and nuclear) are also examined as possible alternatives to the project. These technologies would either be potentially infeasible at the scale of the PSPP, or would not substantially reduce one or more of the project's significant impacts without creating their own significant impacts in other locations. A natural gas plant would contribute to greenhouse gas emissions and would not meet the project's renewable generation objective. Construction of new nuclear power plants is currently prohibited under California law. Wave and tidal technologies are not yet commercially available in the United States.

Conservation and demand side management programs would likely not meet the state's growing electricity needs that would be served by the Palen Solar Power Project. In addition, these programs would not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements.

Staff's analysis of renewable energy technology options indicates that contributions from each commercially available renewable technology will be needed to meet California's Renewable Portfolio Standard requirements and to achieve the statewide RPS target for 2020 (between 45,000 GWhs to almost 75,000 GWhs according to the 2009 IEPR). Therefore, the combined contribution of the alternatives of wind, distributed solar photovoltaic, geothermal, and biomass is needed to complement rather than substitute for the Palen Solar Power Project solar thermal contribution to meeting SCE and statewide RPS requirements. The table below indicates that each of these four alternative technology options when considered individually, is insufficient to meet the project objectives related to the RPS.

Alternatives Table 1 lists the alternatives retained for analysis in this RSA and those eliminated, and summarizes the rationale for each conclusion.

Alternatives Table 1
Summary of Alternatives Retained and Eliminated

Alternative	Rationale for Retention or Elimination
Alternatives Retained for CEQA and NEPA Analysis	
Reconfigured Alternative – 500 MW	Evaluated in the RSA because it would reduce impacts of the Palen Solar Power Project.
Reconfigured Alternative #2 – 500 MW	Evaluated in the RSA because it would reduce impacts of the Palen Solar Power Project.

Alternative	Rationale for Retention or Elimination
Reconfigured Alternative #3 – 500 MW	Evaluated in the RSA because it would reduce impacts of the Palen Solar Power Project.
Reduced Acreage Alternative – 375 MW	Evaluated in the RSA because it would substantially reduce impacts of the Palen Solar Power Project.
No Project/No Action Alternative	Required under CEQA.
Land Use Plan Amendment Alternatives Evaluated Only under NEPA	
Authorize Palen Solar Power Project through a CDCA Land Use Plan Amendment	Action required under the CDCA Plan of 1980, as amended. Additional land use plan amendments depicted in Appendix B would apply to this Alternative.
Authorize Reconfigured Alternative of the same acreage through a CDCA Land Use Plan amendment	A reconfigured project reduces impacts; site location is an action for which an amendment to the CDCA Plan of 1980, as amended, is required. Additional land use plan amendments depicted in Appendix B would apply to this Alternative.
Amend CDCA Land Use Plan for a Reduced Acreage Alternative (375 MW) on the proposed project site	A smaller project reduces impacts; site location is an action for which an amendment to the CDCA Plan of 1980, as amended, is required. Additional land use plan amendments depicted in Appendix B would apply to this Alternative.
Do not approve the ROW grant and do not amend the CDCA Land Use Plan of 1980, as amended.	The first No Action Alternative: deny the ROW application and does not amend the CDCA Land Use Plan of 1980.
Do not approve the ROW grant and amend the CDCA Land Use Plan of 1980, as amended, to make the area unavailable for future renewable development.	The second No Action Alternative: deny the ROW application and amend the CDCA Land Use Plan of 1980 to make the site unavailable for any future renewable development. Additional land use plan amendments depicted in Appendix B would apply to this Alternative.
Do not approve the ROW grant and amend the CDCA Land Use Plan of 1980 to make the area available for future renewable development.	The third No Action Alternative: deny the ROW application but amend the CDCA Land Use Plan of 1980 to make the site available for future solar development.
Site Alternative Evaluated in Detail	
North of Desert Center Alternative	Would substantially reduce impacts of the Palen Solar Power Project while meeting most project objectives.
Site Alternatives Eliminated from Detailed Analysis	
Cibola	Would not substantially reduce impacts of the Palen Solar Power Project.
Palen Pass	Palen Pass region was in an area that would potentially be subsumed in expansions of the Joshua Tree National Park and/or the McCoy Wilderness. In the fall of 2008, the BLM rejected the application for ROW grant for the use of the Palen Pass region.
Desert Center	Infeasible due to location within a Desert Wildlife Management Area.
Palo Verde Mesa	Would not substantially reduce impacts of the Palen Solar Power Project; two pending right-of-way grant application for the site, applications that are first in time are given priority in consideration. Would not be a reasonable alternative for the proposed Palen Solar Power Project unless that other application is rejected or withdrawn.

Alternative	Rationale for Retention or Elimination
Technology Alternatives Eliminated from Detailed Analysis	
Stirling Dish Technology	Would not substantially reduce impacts of the Palen Solar Power Project.
Solar Power Tower Technology	Would not substantially reduce impacts of the Palen Solar Power Project.
Linear Fresnel Technology	Would reduce area required by about 40% but would not eliminate significant impacts of the Palen Solar Power Project.
Solar Photovoltaic Technology – Utility Scale	Would reduce water use but not substantially reduce impacts of the Palen Solar Power Project.
Distributed Solar Technology	While it will very likely be possible to achieve 500 MW of distributed solar energy over the coming years, the limited numbers of existing facilities make it difficult to conclude with confidence that this much distributed solar will be available within the timeframe required for the Palen Solar Power Project. Barriers exist related to interconnection with the electric distribution grid. Also, solar PV is one of the components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements, and additional technologies like solar thermal generation, would also be required.
Wind Energy	While there are substantial wind resources in Riverside Counties, environmental impacts could also be significant so wind would not reduce impacts in comparison to the Palen Solar Power Project. Also, wind is one of the components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements, so additional technologies like solar thermal generation, would also be required.
Geothermal Energy	Despite the encouragement provided by Renewable Portfolio Standards and ARRA funding, few new geothermal projects have been proposed in the Imperial Valley and no geothermal projects are included on the Renewable Energy Action Team list of projects requesting ARRA funds. Therefore, the development of 500 MW of new geothermal generation capacity within the timeframe required for the Palen Solar Power Project is considered speculative.
Biomass Energy	Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW) and so could not meet the project objectives related to the California Renewable Portfolio Standard. In addition, between 100 and 200 facilities would be needed to achieve 500 MW of generation, creating substantial adverse impacts.
Tidal Energy	Tidal fence technology is commercially available in Europe. However, it has not been demonstrated and proven at the scale that would be required to replace the proposed project, particularly with Pacific tides. It may also result in substantial adverse environmental impacts.
Wave Energy	Unproven technology at the scale that would be required to replace the proposed project; it may also result in substantial adverse environmental impacts.
Natural Gas	Would not attain the objective of generating renewable power meeting California's renewable energy needs.
Coal	Would not attain the objective of generating renewable power meeting California's renewable energy needs and is not a feasible alternative in California.

Alternative	Rationale for Retention or Elimination
Nuclear Energy	The permitting of new nuclear facilities in California is not currently allowable by law.
Conservation and Demand-side Management	Conservation and demand-management alone are not sufficient to address all of California's energy needs, and would not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements

B.2.2 INTRODUCTION

Palen Solar I, LLC[1] proposes to build the Palen Solar Power Project (PSPP) on public land, which is land administered by the BLM. Since the BLM is a federal agency, the PSPP is subject to review under the National Environmental Policy Act (NEPA) in addition to the California Environmental Quality Act (CEQA). The purpose of this alternatives analysis is to comply with State and Federal environmental laws by providing a reasonable range of alternatives which, under CEQA, could substantially reduce or avoid any potentially significant adverse impacts of the proposed project, or under NEPA, would inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment. This section summarizes the potentially significant impacts of the proposed project and analyzes different technologies and alternative sites that may reduce or avoid significant impacts.

Of the 24 alternatives, four alternatives were determined to be both reasonable for the BLM and potentially feasible for the Energy Commission: the Reconfigured Alternative, Reconfigured Alternative #2, Reconfigured Alternative #3, and the Reduced Acreage Alternative. These alternatives and the No Project/No Action Alternative are analyzed in further detail within each of the technical sections of this document, and are considered for selection as the preferred alternative.

This section presents analysis of one site alternative that is evaluated under CEQA only and presents the plan amendment alternatives evaluated under NEPA only. The section also presents the discussion and analysis of all alternatives eliminated from detailed consideration by both the Energy Commission and the BLM.

B.2.3 ALTERNATIVES DEVELOPMENT AND SCREENING PROCESS

CALIFORNIA ENVIRONMENTAL QUALITY ACT CRITERIA

The *Guidelines for Implementation of the California Environmental Quality Act*, Title 14, California Code of Regulations, section 15126.6(a), provides direction by requiring an evaluation of the comparative merits of "a range of reasonable alternatives to the

[1] Chevron Energy Solutions and Solar Millennium have a joint development agreement Chevron Energy Solutions applied for the Right of Way for Palen Solar Power Project. To facilitate the permitting of the Palen Solar Power Project (PSPP), the Applicant is requesting that the CEC issue one license to a project- specific company. The company for PSPP is Palen Solar I, LLC a wholly owned subsidiary of Solar Millennium and the single Applicant for the PSPP.

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 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 the effect of which cannot be reasonably ascertained and of which the implementation is remote and speculative (Cal. Code Regs., tit. 14, § 15126.6).

B.2.4 SCREENING METHODOLOGY

To prepare the alternatives analysis, the following methodology was used:

1. Develop an understanding of the project, identify the basic objectives of the project, and describe its potentially significant adverse impacts.
2. Identify and evaluate technology alternatives to the project such as increased energy efficiency (or demand-side management) and the use of alternative generation technologies (e.g., solar or other renewable or nonrenewable technologies).
3. Identify and evaluate alternative locations.
4. Evaluate potential alternatives to select those qualified for detailed evaluation.
5. Evaluate the impacts of not constructing the project, known as the No Project Alternative under CEQA.

Based on this methodology, each potential alternative was evaluated according the following criteria for its ability to:

- Avoid or substantially lessen one or more of the potential significant effects of the project as described above;
- Meet most project objectives;
- Not create unmitigable significant impacts of its own;

B.2.4.1 APPLICANT'S PROJECT OBJECTIVES

The following objectives and purpose are set forth by the applicant (Solar Millennium 2009a):

- To develop a utility-scale solar energy project utilizing parabolic trough technology.
- To construct and operate an environmentally friendly, economically sound, and operationally reliable solar power generation facility that would contribute approximately 1,000,000 megawatt hours (MWh) of clean, renewable solar energy per year to the State of California's renewable energy goals.
- To locate the project in an area with high solar insolation (i.e., high intensity of solar energy).

- To interconnect directly to the CAISO Grid through the SCE electrical transmission system while minimizing additions to electrical infrastructure (e.g., avoiding lengthy new transmission lines).
- To commence construction in 2010 to qualify for the American Recovery and Reinvestment Act (ARRA) of 2009's Renewable Energy Grant Program.

Additionally, the applicant states the need for the project as:

- Assist California in meeting its Renewable Portfolio Standard (RPS) goals of 20% of retail electric power sales by 2010 under existing law (Senate Bill 1078 – Chapter 516, Statutes of 2002) and 33% of electrical power retail sales by 2020 under pending legislation.
- Support U.S. Secretary of the Interior Salazar's Order 3283 and 3285 making the production, development and delivery of renewable energy top priorities for the United States.
- Support Governor Schwarzenegger's Executive Order S-14-08 to streamline California's renewable energy project approval process and to increase the State's Renewable Energy Standard to 33% renewable power by 2020.
- Sustain and stimulate the economy of Southern California by helping to ensure an adequate supply of renewable electrical energy, while creating additional construction and operations employment and increased expenditures in many local businesses.
- Generate electricity without significant emissions of greenhouse gases, thereby meeting the statewide reduction goals of Assembly Bill (AB) 32.

B.2.4.2 PROJECT OBJECTIVES AS DETERMINED BYENERGY COMMISSION STAFF

After considering the objectives set out by the applicant, the Energy Commission has identified the following basic project objectives, which are used to evaluate the viability of alternatives in accordance with CEQA requirements:

- To construct a utility-scale solar energy project of up to 500 MW and interconnect directly to the CAISO Grid while minimizing additions to electrical infrastructure; and
- To locate the facility in areas of high solar insolation.

In addition, when considering retention or elimination of alternative renewable technologies, in addition to evaluating the likelihood of reducing or eliminating the potential impacts of Palen Solar Power Project at its proposed site, staff evaluated whether alternative technologies could meet the following key project objectives:

- To provide clean, renewable electricity to support California's Renewable Portfolio Standard Program (RPS);
- To assist in reducing its greenhouse gas emissions as required by the California Global Warming Solutions Act;
- To contribute to the achievement of the 33% renewables RPS target set by California's governor and legislature; and

- To complete the review process in a timeframe that would allow the applicant to start construction or meet the economic performance guidelines by December 31, 2010 to potentially qualify for the 2009 ARRA cash grant in lieu of tax credits for certain renewable energy projects.

B.2.4.3 IMPACTS OF THE PROPOSED PROJECT

Based on the analysis presented in the technical sections of this Revised Staff Assessment (RSA), the following impacts have been identified as issues of greatest concern for the PSPP:

- **Cultural Resources:** Although the BLM plans to address cultural resources through a Programmatic Agreement (PA) negotiated amongst all federal, state, and private stakeholders, the RSA includes Conditions of Certification that would mitigate direct project impacts to cultural resources to a level that is not significant. The project's contribution to cumulative impacts, however, would be considerable and unmitigable. Development of the PA by the BLM is underway, but will not be completed until mid-summer.
- **Biological Resources:** The impacts of the proposed Project to the sand transport corridor and sand dune habitat cannot be mitigated to less than significant levels. The direct, indirect, and cumulative impacts to the Mojave fringe-toed lizard, a sand-dependent species considered sensitive by state and federal agencies, are also significant and unmitigable. Compensatory mitigation to acquire and protect sand dune habitat for these species within the Chuckwalla Valley would in part offset the habitat loss, but not to less than significant levels. In the SA/DEIS staff concluded that Project impacts to the Project area washes would be significant and unmitigable because they would have eliminated a vital movement corridor for desert tortoise and other wildlife. Since the SA/DEIS was published the Applicant has provided additional information about connectivity of habitat along 32-miles of I-10 (AECOM 2010f). With this new information staff has concluded that with implementation of appropriate mitigation measures the Project or the two new reconfigurations of the Project would not result in significant unmitigated impacts to connectivity for desert tortoise and other wildlife.
- **Land Use:** A 40-acre parcel (APN: 810-110-007) within the project site is under the County of Riverside's jurisdiction. The proposed project's use of this parcel represents a use that would be inconsistent with the stated intent of the Riverside County General Plan, Eastern Riverside County Land Use Plan, and the county's "Open Space–Rural" general plan land use designation. The proposed project also creates a significant impact under "Wilderness, Special Designations, and Recreation" condition "B" because the project would result in a significant and unavoidable visual impact under CEQA. Impacts to land use would be cumulatively considerable because when combined with future foreseeable projects, the project would remove large acreages of land from other multiple-use opportunities.
- **Visual Resources:** The proposed project would result in a substantial adverse impact to existing scenic resource values as seen from several viewing areas and Key Observation Points in the project vicinity and Chuckwalla Valley area. The project in combination with foreseeable future projects (both local and region-wide) would cause significant unavoidable cumulative visual impacts within the immediate

project viewshed and would contribute to a perceived sense of industrialization of the open, undeveloped desert landscape along the I-10 Corridor in particular and within the California Desert Conservation Area overall.

- **Soil and Water Resources:** The combined sand corridor is a regionally significant geomorphic feature that transports sand downwind along the valley and to the Colorado River. Blocking such a large area of the corridor will likely have a large impact both onsite and offsite, by disrupting sand transport to downwind sites that are biologically significant. It is unclear how such large scale impacts to sand transport can be mitigated. The area downwind of the project that will be substantially impacted under the applicant's Proposed Project is estimated to be 625 acres, with a further 787 acres moderately impacted. The cumulative effects may indirectly impact the adjacent Palo Verde Mesa Groundwater Basin inducing underflow from the Colorado River.

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

B.2.5 SUMMARY OF SCOPING AND SCREENING RESULTS

The public scoping comment period allowed the public and regulatory agencies an opportunity to comment on the scope of the environmental document, comment on the alternatives considered, and to identify issues that should be addressed in the environmental review. The discussion below presents the key issues identified from the written and oral comments received on the PSPP. The specific issues raised during the public scoping process are summarized as follows:

- Alternatives should consider a reduced acreage alternative, including eliminating the northeastern portion of the project occupied by a large number of Mojave Fringe-Toed Lizards (see Section B.2.6.2);
- Alternatives should include consideration of disturbed, private lands immediately west of the PSPP (see Section B.2.7.2);
- Alternatives should not be tied to a specific Power Purchase Agreement that the applicant may have entered into (see Section B.2.3);
- Alternatives should consider technologies that use less water (see Section B.2.8.2);
- Alternatives should consider using disturbed private lands, including land that is outside of BLM jurisdiction, and distributed generation (see Section B.2.7.2 and Section B.2.8.2);
- Alternatives should be placed near existing transmission lines (The I-10 corridor is a designated utility corridor with existing and planned transmission lines);
- Private sites should not be rejected simply because they have numerous owners – there is no indication the level of effort the applicant put into acquiring private lands (see Section B.2.7.2);
- Energy Commission and BLM should prioritize solar projects on lands that have already been disturbed or industrialized (see Section B.2.7.2);

- Agencies should compare the PSPP and its impacts with all other identified "fast-track" projects on BLM land in order to identify the least environmentally harmful projects among the applications that have been selected for expedited permitting;
- According the Energy Commission, only 128,000 acres maximum (both private and public) are needed to achieve the RPS goal so there is ample opportunity to consider species migration needs and patterns, established wildlife corridors and climate change implications on proposed project lands;
- Project should be phased to ensure technology is feasible (Technology has been proven feasible; however, a Reduced Acreage Alternative is considered, see Section B.2.6.2).

Scoping comments are also listed in **Introduction Table 1** of the **Introduction** section of this RSA.

B.2.6 ALTERNATIVES EVALUATED

A number of scoping comments requested that the project be reconfigured or reduced in size to avoid the northeastern region where impacts to sand dunes and Mojave Fringe-toed lizards would be greater and to avoid the desert washes associated with desert tortoise connectivity. Scoping comments suggested including the disturbed lands in the vicinity of the project in the project footprint to make up for any loss in acreage. After publication of the SA/Draft EIS, two additional 500 MW reconfigured alternatives were added to this RSA to further reduce or eliminate significant impacts to sand dunes and Mojave Fringe-toed lizard. The scoping comments were incorporated into the alternatives described herein and in the site alternative evaluated in Section B.2.7. This section describes five alternatives to the proposed project: the Reconfigured Alternative, Reconfigured Alternative #2, Reconfigured Alternative #3, the Reduced Acreage Alternative, and the "No Project/No Action" Alternative. The alternatives are evaluated under CEQA in Sections C and D (Environmental and Engineering Analysis).

B.2.6.1 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

Proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the applicant's Palen ROW application area but the alternative would remain entirely within BLM managed lands.

Proposed Unit 2 (the western solar field) would remain in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast avoid the primary and secondary washes crossing the site.

This reconfigured alternative was developed in response to a data request from Energy Commission and BLM staff, which requested the applicant to avoid specific resources of

concern. The configuration suggested by staff was considered to be infeasible by the applicant, but the applicant designed this Reconfigured Alternative as an alternate method of avoiding the same resources.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is defined by the applicant as feasible;
- It reduces impacts to the primary and secondary desert washes that cross the proposed site; and
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

The Reconfigured Alternative would change the shapes of both Units 1 and 2. Unit 1 would be a 250 MW solar generating facility on about 1,490 acres and Unit 2 would be a 250 MW solar generating facility, on approximately 1,450 acres of land. The reconfigured units would use approximately 180 acres more land than the proposed Units 1 and 2 which were located on 1,380 acres each. In addition to reconfiguring the Unit 1 and 2 solar fields, it would also modify the power block, water treatment system, water storage tanks, and the administration, control, warehouse, maintenance, and lab buildings.

Similar to the proposed project, the Reconfigured Alternative would transmit power to the grid through the Red Bluff Substation. It would require the same infrastructure as the proposed project, including on-site wells, transmission line, road access, gas pipeline, main office and warehouse buildings, and central internal switchyard. The transmission line, road access, and gas pipeline would remain approximately the same length as for the proposed project. The required linear facility routes would require minor adjustments to accommodate the changed solar field configurations.

B.2.6.2 RECONFIGURED ALTERNATIVE #2

Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would change the shape of Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. Solar Unit 2 would be unchanged from its design for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

Proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. This alternative would reconfigure Unit 1 into a triangular shape trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant.

The site plan for Reconfigured Alternative #2 assumes that the Applicant can acquire the 240 acres of private land as part of this redesign effort. This alternative also would require adjustment of the boundaries of the BLM Right-of-Way (ROW) as the alternative includes land not currently included in the proposed ROW.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor along the northern and northeastern portions of the site.

As stated above, Reconfigured Alternative #2 would change the shape of Unit 1. Unit 1 would consist of 280 solar loops and one 250 MW power block. There are no changes to the power block equipment layout associated with Unit 1, but the entire power block has been shifted south by approximately 2,700 feet (0.5 miles). The evaporation ponds for Unit 1 of Reconfigured Alternative #2 are unchanged in terms of function and size, but, they have also been relocated slightly south and east of their location under the proposed project. The Unit 1 bioremediation area remains unchanged in terms of function and size, but has been relocated to the mid-southwesterly portion of the solar field.

Unit 2 would be unchanged from the proposed project and would consist of 288 solar loops and one 250 MW power block in the same location as for the proposed project.

The shared facilities area includes: a warehouse/laydown yard, and an administrative office area, and a parking lot. A single circuit 230 kV transmission line originating at each power block terminates at the Central Switchyard. A single circuit 230 kV gen-tie line will connect from the Central Switchyard to SCE's proposed Red Bluff Substation. The 230 kV gen-tie line would remain in the same location for the Reconfigured Alternative #2 as for the proposed project. The administrative office area for the Reconfigured Alternative #2 site has not changed nor has the access to the overall PSPP site. The location of the warehouse/laydown yard has shifted approximately 3,000 feet to the west, but the size of the warehouse and the functional use of the space is the same as with the proposed project.

The grading and drainage detailed design for Reconfigured Alternative #2 will be slightly different from the proposed project, but the drainage concept and the grading approach will be same. Drainage channels for the alternative include the following components:

- The western channel is the same as for the proposed project.
- The central channel is essentially unchanged from the proposed project but would be approximately 800 feet longer than in the proposed project plan. The width and depth of the central channel will remain unchanged. The flow in the channel is also anticipated to be very similar to the proposed project configuration.
- The east channel will be approximately 7,000 feet longer than for the proposed project, but the flows from the upstream areas to the downstream areas will be maintained for peak flows and volumes just as they were in the proposed project.
- Under Reconfigured Alternative #2, one additional drainage channel has been added on the southeast side of the PSPP site to intercept off-site drainage flows. This channel will be engineered in the same fashion as the other channels such that

the upstream flow is directed to the same general downstream discharge area as the pre-development flow.

- One additional on-site peripheral channel has been added in the mid-northeastern portion of the Reconfigured Alternative #2 site plan to direct on-site flows to the appropriate downstream area.

Additionally, as with the proposed project, the existing Southern California Edison (SCE) 161-kV Eagle Mountain-Blythe power line which runs in a northwesterly direction across the southwest portion of the PSPP site, would require relocation. PSI is working with SCE to relocate the SCE line within the BLM ROW.

B.2.6.3 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would generate 500 MW like the proposed project, but it would reconfigure Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1C**. The total area of disturbance for Reconfigured Alternative #3 would be approximately 4,330 acres.

Proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would reconfigure Unit 1 so that it is triangular in shape trending southeast. However, the reconfigured Unit 1 was designed to avoid use of the private land along its southern border, so would not retain a straight southern border. This reconfigured eastern solar field would be located primarily on public land managed by BLM; however, as with the proposed project, it includes a 40 acre private parcel on which the applicant has a purchase option. This alternative also would require adjustment of the boundaries of the BLM Right-of-Way (ROW) as the alternative includes land not currently included in the proposed ROW.

Proposed Unit 2 (the western solar field) would remain the same as for the proposed project. This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

As stated above, the Reconfigured Alternative #3 would change the shape of Unit 1. Unit 1 would consist of 288 solar loops and one 250 MW power block. Unit 2 would remain unchanged from the proposed project and would consist of 288 solar loops and one 250 MW power block in the same location as for the proposed project. There are no changes to the power block equipment layout associated with Unit 1, but the entire power block has been shifted south by approximately 2,700 feet (0.5 miles). The evaporation ponds for Unit 1 of Reconfigured Alternative #3 are unchanged in terms of function and size, but, they have also been relocated slightly south and east of their location under the proposed project. The Unit 1 bioremediation area remains unchanged in terms of function and size, but has been relocated to the mid-southwesterly portion of the solar field.

The shared facilities area includes: a warehouse/laydown yard, an administrative office area, and a parking lot. A single circuit 230 kV transmission line originating at each power block terminates at the Central Switchyard, the location of the Central Switchyard has not changed from the proposed project. A single circuit 230 kV gen-tie line will connect from the Central Switchyard to SCE's proposed Red Bluff Substation. The 230 kV gen-tie line would remain in the same location for the Reconfigured Alternative #3 as for the proposed project. The administrative office area for the Reconfigured Alternative #3 site has not changed nor has the access to the overall PSPP site. The location of the warehouse/laydown yard has shifted approximately 3,000 feet to the west, but the size of the warehouse and the functional use of the space is the same as with the proposed project.

The grading and drainage detailed design for Reconfigured Alternative #3 will be slightly different from the proposed project, but the drainage concept and the grading approach will be the same. The drainage plan for the Reconfigured Alternative #3 site includes the west channel exactly as for the proposed project. The central channel is essentially unchanged from the proposed project but would be approximately 5,500 feet shorter than in the proposed project plan. The width and depth of the central channel will remain unchanged. The flow in the channel is also anticipated to be very similar to the proposed project configuration. In addition, the Central Channel lateral diffuser has been replaced with a fan diffuser in this alternative due to the fact that the release point for the drainage water occurs at a location where the fan spread of the pre-development flow is narrower.

The east channel will be approximately 1,000 feet longer than for the proposed project, and the lateral diffuser at the end of the East Channel has been extended approximately 1,200 feet to disperse flows from the solar fields. The additional length of the East Channel will have negligible effect on the peak flows and volumes, and these flows from the upstream areas to the downstream areas will be maintained just as they were in the proposed Project. Under Reconfigured Alternative #3, one additional drainage channel has been added to the southeast side of the PSPP site to intercept off-site drainage flows. This channel will be engineered in the same fashion as the other channels so that the upstream flow is directed to the same general downstream discharge area as the pre-development flow. Two additional on-site peripheral channels and three fan diffusers have been added in the mid-northeastern portion of the Reconfigured Alternative #3 site plan to direct on-site flows to the appropriate downstream area.

Additionally, as with the proposed project, the existing Southern California Edison (SCE) 161-kV Eagle Mountain-Blythe power line which runs in a northwesterly direction across the southwest portion of the PSPP site, would require relocation. PSI is working with SCE to relocate the SCE line within the BLM ROW.

B.2.6.4 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be about 25% smaller, occupying about 2,080 acres of land (as compared with 2,740 acres required for Units 1 and 2 of the proposed project). The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**.

The Reduced Acreage Alternative would incorporate the following changes from the Reconfiguration Alternative.

It would modify the boundaries of Unit 1 as follows:

- Preclude the use of the northeastern quarter of the westernmost solar field
- It would reduce and revise the easternmost solar field to avoid the dune habitat
- It would result in approximately 803 acres or approximately 55% of the Reconfigured Alternative Unit 1 (1,467 acres)

It would modify the boundaries of Unit 2 as follows:

- Eliminate the southernmost segment of Unit 2 (170 acres within Desert Tortoise Critical Habitat)
- Eliminate the northernmost area of Unit 2 (260 acres of dune sands and MFTL habitat)
- Add 215 acres to the western end of the second and third rows of solar trough loops to make up for some of the reductions described above.

This alternative is analyzed for several reasons:

- It would eliminate about 25% of the proposed project's area so all impacts would be reduced;
- It would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 1;
- It would reduce impacts to primary and secondary desert washes crossing the proposed site; and
- It would reduce impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley aeolian sand corridor, and the Mojave Fringe-Toed Lizard by prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields.

The Reduced Acreage Alternative would have a net generating capacity of approximately 375 MW (as compared with the 500 MW of the proposed project). This alternative would retain 75% of the proposed project's generating capacity. With engineering input from the Applicant, it may be that this alternative can be further reconfigured to add additional generating capacity while avoiding the significant impacts highlighted above.

The Reduced Acreage Alternative would retain the basic solar collector assemblies, retain the north-south alignment of collector rows, and retain all loops at the same size (as required for feasibility of the project design). The reconfigured Unit 1 would reduce impacts to dune habitat and the Chuckwalla Valley sand dune corridor and result in an approximately 125 MW power facility. By reconfiguring Unit 2, the project would avoid impacts to desert tortoise critical habitat and dune habitat while retaining the acreage and configuration to power a nominal 250 MW power facility.

Similar to the proposed project, the Reduced Acreage Alternative would transmit power to the grid through the Red Bluff Substation. It would require infrastructure including on-site wells, transmission line, road access, administration building, gas pipeline, main

office and warehouse buildings, and central internal switchyard. The transmission line and road access would remain approximately the same length as for the proposed project. The gas pipeline would also remain approximately the same length as for the proposed project. The linears would require minor adjustments to accommodate the modified layout.

B.2.6.5 NO PROJECT/NO ACTION ALTERNATIVE

CEQA No Project Alternative

The No Project Alternative under CEQA defines the scenario that would exist if the proposed Palen Solar Power Project were not constructed. The CEQA Guidelines state that "the purpose of describing and analyzing a 'no project' alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. 14 § 15126.6(i)). The No Project analysis in this RSA considers existing conditions and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (Cal. Code Regs, tit. 14 § 15126.6(e)(2)).

If the No Project Alternative were selected, the construction and operational impacts of the Palen Solar Power Project would not occur. There would be no grading of the site, no loss of resources or disturbance of desert habitat, and no installation of power generation and transmission equipment. The No Project Alternative would also eliminate contributions to cumulative impacts on a number of resources and environmental parameters in Riverside County and in the Mojave Desert as a whole.

In the absence of the Palen Solar Power Project, however, other power plants, both renewable and non-renewable, may have to be constructed to serve the demand for electricity and to meet RPS. The impacts of these other facilities may be similar to those of the proposed project because these technologies require large amounts of land like that required for the Palen Solar Power Project. The No Project/No Action Alternative may also lead to siting of other non-solar renewable technologies to help achieve the California RPS.

Additionally, if the No Project/No Action Alternative were chosen, additional gas-fired power plants may be built, or existing gas-fired plants may operate longer. If the proposed project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide, and California utilities would not receive the 500 MW contribution to its renewable state-mandated energy portfolio.

NEPA No Action Alternatives

Under NEPA, the No Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives. Like the No Project Alternative described above, under the No Action Alternative, the impacts of the Palen Solar Power Project would not occur. While this document is no longer a NEPA document, staff has retained this discussion of all of the alternative analyzed.

BLM is considering two separate actions (whether to approve a plan amendment and whether to approve the proposed project or an alternative). BLM's "action alternative"

would be to amend the CDCA Plan to include Palen Solar Power Project (500 MW), and to approve the project as proposed. The Palen Solar Power Project and ancillary facilities are approved, a ROW grant is issued, and the CDCA Plan is amended to include the Palen Solar Power generation facilities and transmission line as an approved use under the Plan. Similarly, BLM could amend CDCA Plan to include one of the alternatives fully analyzed in this Draft EIS (the Reconfigured Alternative or Reduced Acreage Alternative), and approve the construction and operation of those alternatives. The alternative and ancillary facilities would be approved, a ROW grant for the appropriate acreage would be issued, and the CDCA Plan would be amended to include the alternative power generation facilities and transmission line as an approved site under the Plan.

BLM's alternatives related to the No Action Alternative and the Plan amendment are the following:

- **No Action on project but amend the CDCA plan to make the area available for future renewable development.** The Palen Solar Power Project is not approved (project denied), and no ROW grant is issued to the applicant, but the CDCA plan is amended to make the project area available for large scale renewable energy development under a future project .
- **No Action on project and amend the CDCA plan to make the area unavailable for future renewable development.** The Palen Solar Power Project is not approved (project denied), and no ROW grant is issued to the applicant, and the CDCA plan is amended to make the project area unavailable for large scale renewable energy development.
- **No Action on project application and on land use plan amendment**. The Palen Solar Power Project is not approved (denied), no ROW grant is issued, and no CDCA Plan amendment is approved. There is no consideration of information that would allow approval of a CDCA Plan amendment that would make the land available for large scale energy development in the future.

Each of these No Action Alternatives is addressed under each resource element of Sections C and D of this SA/EIS.

BLM land use plan decisions depicted in Appendix B would apply to all alternatives except the no action alternative that would leave the area available for future development. In addition, public land within the project area found unsuitable for development would be managed as a right of way exclusion area.

B.2.7 SITE ALTERNATIVE RETAINED

In addition to the three Reconfigured Alternatives and the Reduced Acreage Alternative (discussed in Section B.2.6), one site alternative is evaluated by the Energy Commission under CEQA. The North of Desert Center Alternative evaluated in this section is located on private land.

The Energy Commission does not have the authority to approve an alternative or require the applicant to move the proposed project to another location, even if it

identifies an alternative site that meets the project objectives and avoids or substantially lessens one or more of the significant effects of the project. Implementation of an alternative site would require that the applicant submit a new Application for Certification (AFC), including revised engineering and environmental analysis. This more rigorous AFC-level analysis of any of the alternative sites could reveal environmental impacts; nonconformity with laws, ordinances, regulations, and standards; or potential mitigation requirements that were not identified during the more general alternatives analysis presented herein. Preparation and review of a new AFC would require substantial additional time.

No specific alternative site for the PSPP was suggested in scoping comments; however, a number of commenters requested that smaller project alternatives be considered and that alternatives on disturbed private lands be considered.

B.2.7.1 SITE SELECTION CRITERIA

The following site selection criteria identified in the PSPP AFC were used to choose the proposed site (Solar Millennium 2009a):

- The site must receive insolation of no less than 7.0 kilowatt-hours per square meter per day (kWh/m^2/day).
- The site must be large enough (at least 4,000 contiguous acres) and of adequate proportions to include two 250-MW parabolic trough solar thermal plants. The site also must be large enough to site the plants outside of large washes, to the extent possible. The site needs to have no more than a 2% grade and should not be located in a flood zone. Competing land uses and land use designations may make the site more difficult to develop.
- The site should not be highly pristine or biologically sensitive (e.g., not within a designated wilderness area, Area of Critical Environmental Concern [ACEC], or a Desert Wildlife Management Area [DWMA]). The site should also not be located within a military base or park.
- The site should be located within approximately 10 miles of a CAISO-interconnected transmission line with a rating of 230-kilovolts (kV) or higher.
- The site should be in reasonable proximity to existing large, paved roads or freeways.
- The land must be available for sale or lease/ROW, at a reasonable cost (e.g., high value irrigated agricultural lands were excluded). If private land, the site should not be subdivided between more than three landowners to avoid lengthy and/or unsuccessful negotiations. If private land, a lease or purchase option arrangement is necessary so that a large capital investment would not be necessary until the license is obtained.
- The site should be close enough to areas with large construction labor pools so as to maximize the number of construction workers within daily commuting range.

The site criteria state the minimum acreage required for a 500 MW solar trough system facility is 4,000 acres. However, the applicant states that of the project ROW area requested for the PSPP, the project footprint is approximately 2,970 acres (Solar Millennium, 2009a). This would not include the transmission interconnection.

A number of scoping comments included the criteria list for areas to avoid in siting renewable projects defined by Audubon California and other groups:

- Locations that support sensitive biological resources, including: federally designated and proposed critical habitat; significant populations of federal or state threatened and endangered species, significant populations of sensitive, rare and special status species, and rare or unique plant communities;
- Areas of Critical Environmental Concern, Wildlife Habitat Management Areas, proposed HCP and NCCP Conservation Reserves;
- Lands purchased for conservation including those conveyed to the BLM;
- Landscape-level biological linkage areas required for the continued functioning of biological and ecological processes;
- Proposed Wilderness Areas, proposed National Monuments, and Citizens' Wilderness Inventory Areas;
- Wetlands and riparian areas, including the upland habitat and groundwater resources required to protect the integrity of seeps, springs, streams or wetlands;
- National Historic Register eligible sites and other known cultural resources;
- Locations directly adjacent to National or State Park units.

It is noted also that during the FLPMA ROW grant pre-application period, BLM worked closely with the project applicant to identify a feasible site without known environmental concerns. This effort resulted in identification of the proposed site, which does reflect many of the suggested criteria for siting identified by Audubon California. Similarly, the alternative site considered in this RSA was selected to meet as many of these criteria as possible.

Alternative Sites on BLM Land

The BLM has received a large number of utility-scale solar energy project proposals for BLM-administered lands in California. The BLM processes solar energy right-of-way applications under its Solar Energy Development Policy (Instructional Memorandum No. 2007-097) and addresses environmental concerns for the utility-scale energy projects on a case-by-case basis in conformance with its existing policies, manuals, and statutory and regulatory authorities. Under its existing regulations, BLM determines if competing applications exist for the same facility or system. It is BLM's practice to give applications that are first in time priority in consideration and are not considered competing applications with those filed later in time. In addition, another site with an active pending application is not a reasonable alternative to a proposed project, such as PSPP. The site with the pending application is not a reasonable alternative because selection and approval of the site in lieu of the proposed project (or one of its alternatives) is remote and speculative. If BLM were to consider it as an alternative to the proposed project, it would inherently be making a determination of reasonableness of the proposed alternative. However, an active pending application commands priority in consideration for that site location just as an active pending application for the PSPP site commands priority for its site location. Unless and until the active pending application is eliminated from consideration, the BLM would not approve the site with the pending application over the

proposed project, in this case the PSPP. Therefore, an alternative site on BLM land with an active pending application for another project is not considered a reasonable alternative to the proposed project for purposes of alternatives analysis.

The BLM and Department of Energy (DOE) are preparing a Programmatic Environmental Impact Statement (PEIS) on solar energy development in six states in the western U.S. (Arizona, California, Colorado, New Mexico, Nevada, and Utah) (USDOE 2008). As part of the PEIS, the BLM and DOE identified 24 tracts of BLM-administered land for in-depth study for solar development, some or all of which may be found appropriate for designation as solar energy zones in the future. The public scoping period on the solar energy zone maps ended September 2009. The Draft PEIS should be published in 2010; the appropriateness of siting solar energy plants on various land use designations may be revisited in the PEIS.

Executive Order S-14-08 requires the Renewable Energy Action Team to establish a Desert Renewable Energy Conservation Plan (DRECP) for the Mojave and Colorado Desert regions. The Planning Agreement regarding the DRECP is entered into by the Energy Commission, California Department of Fish and Game, BLM, and U.S. Fish and Wildlife Service and is charged with identifying areas suitable for renewable energy project development and areas that will contribute to the conservation of sensitive species and natural communities. A draft report identifying these areas is expected to be published in the first quarter of 2010.

Design of the Proposed Project

The proposed project (Palen Solar Power Plant) is a nominal 500 MW solar plant located on approximately 3,000 acres. The project is divided into two units:

- Unit 1 (eastern power block and solar field) would be located on approximately 1,380 acres and would create 250 MW of solar energy;
- Unit 2 (western power block and solar field) would be located on approximately 1,380 acres and would create 250 MW of energy.

The two power generating units will share a main office building, a main warehouse/maintenance facility and laydown area, a 200-vehicle parking lot, onsite access roads, and two land treatment units (LTUs) to bioremediate or land farm HTF-contaminated soil (Solar Millennium, 2009a).

B.2.7.2 NORTH OF DESERT CENTER ALTERNATIVE

Scoping comments requested that an alternative site be considered on disturbed land, thereby lessening the potential project impacts to the desert environment. Commenters also noted that disturbed agriculture lands occur adjacent to the project and should be considered as possible alternatives.

The Center for Biological Diversity published the Potential Solar Energy Study Areas map (9/09/09) that highlighted potential Solar Energy Study Areas on private lands immediately adjacent to the Department of Energy and BLM identified Solar Energy Study Areas on public lands. A portion of the Desert Center Alternative is located within

this area. Land east of the North of Desert Center Alternative was not included in the alternative because it encompasses the area included in the proposed Desert Center race track.

Local agencies were contacted in the Blythe region and a representative of the Palo Verde Irrigation District Real Estate Division stated that land in Eastern Riverside County had been used for growing jojoba in the past but was no longer being actively farmed. This included portions of land north of Desert Center.

The North of Desert Center Alternative site is located along Desert Center Rice Road (State Route 177) east of Kaiser Road, north of Oasis Road, and approximately 1.6 miles north of I-10. The North of Desert Center Alternative Figure is located on approximately 5,900 acres of land. However, only approximately 3,900 acres would be required for the alternative and the facility would require grading of approximately 3,000 acres. The North of Desert Center Alternative is comprised largely of private properties but also includes approximately 2,000 acres of BLM land and some County of Riverside land. Of the 6,000 acres of land shown in **Alternative Figure 3**, approximately 500 acres in the northeastern corner would be avoided to reduce impacts to the desert wash separating the southern and northern portions of the site. Additionally, approximately 320 acres in the southeastern corner would be avoided because it is active agriculture land. Sufficient contiguous land is available for a 500 MW solar thermal project within the North of Desert Center Alternative. As more land is available than would be required by the alternative, additional sensitive resources such as residences would be avoided. The alternative would be located just east of the Chuckwalla Valley Raceway, a 400-acre racing facility located at the Desert Center Airport.

This land would be within the Colorado Desert with appropriate slope and solarity requirements.

Alternatives Figure 3 shows the Desert Center Alternative. This alternative is located on a total of approximately 5,900 acres; however, only approximately 3,000 acres would be graded and used for the solar facilities. Portions of the alternative with desert washes and residences would be avoided. The elevation of the site is between 500 and 700 feet above sea level. The site would be accessed via Rice Road (SR 177) off the I-10.

The North of Desert Center Alternative sites would be made up of approximately 151 unique parcels with 40 land owners. The Final Phase 2a Report published by the Renewable Energy Transmission Initiative (RETI) and updated in September 2009 identified private land areas for solar development only if there were no more than 20 owners in a 2-square-mile (1,280-acre) area. The majority of the North of Desert Center parcels have supported agricultural operations in the past, and some are currently in agricultural production; however these parcels would be avoided when designing the project.

Transmission Interconnection. The North of Desert Center Alternative would require an approximately 4.6-mile transmission interconnection. Approximately 2 miles of the transmission line would be located in a CDD Designated Utility Corridor. The transmission line would follow an existing SCE 161 kV transmission line that crosses the alternative site.

The transmission interconnection would exit the North of Desert Center Alternative to the southeast for approximately 2.5 miles. The transmission line would then turn directly south for approximately 2.1 miles and enter the proposed Red Bluff Substation from the north. The transmission line would cross the I-10 at the same location as the preferred transmission line interconnection for the Desert Sunlight First Solar project.

Feasibility and Project Objectives. The North of Desert Center Alternative is potentially feasible and meets all but one of the project objectives. Due to the required acquisition of numerous private parcels, it would not likely be able to meet the objective of approval in 2010 to allow ARRA funding.

Environmental and Engineering Assessment of the North of Desert Center Alternative

Air Quality

Environmental Setting. As with the proposed project, the North of Desert Center Alternative would be located in the Mojave Desert Air Basin (MDAB), under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The MDAB exceeds the State 1-hour and 8-hour ozone standards and the State 24-hour PM10 standard. Additional information regarding the MDAB and SCAQMD can be found in the **Air Quality** section of the RSA.

Environmental Impacts. Exhaust emissions from heavy-duty diesel and gasoline-powered construction equipment and fugitive particulate matter (dust) would be essentially the same at any site. Exhaust emissions would also be caused by workers commuting to and from the work sites, from trucks hauling equipment and supplies to the sites, and crew trucks (e.g., derrick trucks, bucket trucks, pickups). Workers and trucks hauling equipment and supplies would have to commute approximately 50 miles east (from Blythe) or approximately 50 miles west (from the Coachella and Indio region) to reach the North of Desert Center Alternative. The proposed project is located approximately 10 miles east of the North of Desert Center Alternative. Appropriate mitigation at the Desert Center Alternative site would likely involve similar, locally oriented recommendations such as the conditions of certification presented in the **Air Quality** section of this RSA.

This assessment was prepared before the South Coast Air Quality Management District (SCAQMD) issued the Preliminary Determination of Compliance (PDOC) document for the PSPP. Staff believes that SCAQMD will find that the proposed project complies with SCAQMD rules and regulations, and as such, it is likely that an alternative location would as well; however, additional conditions of certification may be required for stationary source equipment that is exempt from the SCAQMD permit process.

As with the proposed PSPP, the North of Desert Center Alternative would emit some GHG emissions. However, the contribution of the project, if built at the North of Desert Center Alternative, to the system build-out of renewable resources to meet the goals of the Renewable Portfolio Standard (RPS) in California would result in a net cumulative reduction of energy generation and GHG emissions from new and existing fossil-fired electricity resources. Electricity is produced by operation of inter-connected generation resources. Operation of one power plant, like PSPP, affects all other power plants in the

interconnected system. The operation of the PSPP at the North of Desert Center Alternative site would affect the overall electricity system operation and GHG emissions in several ways:

- North of Desert Center Alternative would provide low-GHG, renewable generation.
- North of Desert Center Alternative would facilitate to some degree the replacement of high GHG emitting electricity generation that cannot be renewed under long-term contracts pursuant to the State's 2006 Emissions Performance Standard.
- North of Desert Center Alternative could facilitate to some extent the replacement of generation provided by aging fossil-fired power plants that use once-through cooling.

These system impacts would result in a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, as with the proposed PSPP, the North of Desert Center Alternative would result in a cumulative overall reduction in GHG emissions from power plants, does not worsen current conditions, and would not result in impacts that are cumulatively CEQA significant.

Comparison to Proposed Project. The construction and operational emissions at the North of Desert Center Alternative site would be similar to those of the PSPP at the proposed site.

Biological Resources

Environmental Setting. The North of Desert Center Alternative site is located west of the Proposed Project site, north of the I-10, and straddles Rice Road (SR 177). The Desert Center Alternative site comprises a total of approximately 5,000 acres, most of which is private agricultural land. A portion of the North of Desert Center Alternative site is owned by BLM.

Desert Center is located in the Colorado Desert Bioregion, encompassing all of Imperial County, the southeastern portion of Riverside County, the eastern end of San Bernardino County, and the eastern portion of San Diego County. This agriculturally rich bioregion is semi-arid and heavily irrigated (California Environmental Resources Evaluation System [CERES] 2010).

The Colorado Desert is the western extension of the Sonoran desert, which covers southern Arizona and northwestern Mexico. Much of the Colorado Desert lies below 1,000 feet in elevation. Mountain peaks rarely exceed 3,000 feet. Common habitats include sandy desert, scrub, palm oasis, and desert wash. Summers are hot and dry, and winters are cool and moist (CERES 2010).

The Colorado Desert supports a diverse array of plant and animal species including the Yuma antelope ground squirrel (*Ammospermophilus harrisii*), white-winged dove (*Zenaida asiatica*), muskrat (*Ondatra zibethicus*), southern mule deer (*Odocoileus hemionus fuliginata*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and raccoon (*Procyon lotor*). Rare animals include desert pupfish (*Cyprinodon macularius*), flat-tailed horned lizard (*Phrynosoma mcallii*), Andrew's dune scarab beetle (*Pseudocotalpa andrewsi*), Coachella Valley fringe-toed lizard (*Uma inornata*), Le Conte's thrasher (*Toxostoma lecontei*), and California leaf-nosed bat (*Macrotus californicus*). Rare plants include

Orcutt's woody aster (*Xylorhiza orcuttii*), Orocopia sage (*Salvia greatae*), foxtail cactus (*Coryphantha alversonii*), Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*), and crown of thorns (*Euphorbia* sp.; CERES 2010).

The North of Desert Center Alternative site consists mostly of fallow agricultural fields and some active orchards. The Rice Road traverses the site from the southwestern corner to the northeastern corner. Surrounding lands to the north, east, and west are mostly undeveloped BLM land, and to the south are private lands that make up Desert Center including the Desert Center Airport and the newly constructed Chuckwalla Valley Racetrack, along with rural residences. The dry McCoy Wash is located southwest of the northern and eastern portions and northwest of the southern portion of the Desert Center Alternative site. Topography on the Desert Center Alternative site is relatively flat, with elevation ranging from approximately 340 to 570 feet above mean sea level, from the south to the north. Soils mapped for the Desert Center Alternative site are comprised primarily of three soil series: Rositas, Orita, and Aco; most of which is classified as prime farmland. Other soil series mapped for the Desert Center Alternative site include Carrizo, Valva, Quilotosa, Hyder, Cipriano, and Cherioni (Soil Survey Staff 2009).

One major wash passes through the north-central portion of the North of Desert Center Alternative site and supports desert dry wash woodland and would be considered waters of the state under the jurisdiction of the CDFG and could potentially be considered waters of the U.S. under the jurisdiction of the ACOE. However, based on review of regional aerial photography, it does not appear that this wash is connected to any waters of the U.S. A focused delineation may be necessary to confirm that this is the case. Additionally, an area supporting Sonoran creosote bush scrub south of the large wash shows evidence of some potential surface water flow. However, the area is surrounded on three sides by fallow agricultural fields (the fourth side is adjacent to the wash), and the flow appears to be historic. As with the large wash, this area does not appear connected to any waters of the U.S. based on a review of aerial photography. Similarly, a focused delineation may be necessary to confirm that this is the case. Since this area does not support riparian vegetation, such as desert dry wash woodland, it would not be considered waters of the state. Because the North of Desert Center Alternative site is larger than required for the project, the large wash would be avoided when siting the facility.

Undisturbed portions of the North of Desert Center Alternative site were observed being used, directly or via sign, by common animal species such as coyote, black-tailed jackrabbit, white-crowned sparrow (*Zonotrichia leucophrys*), northern flicker (*Colaptes auratus*), Say's phoebe (*Sayornis saya*), and kangaroo rat. Little wildlife use was noted in areas supporting fallow agriculture.

The large wash supporting desert dry wash woodland that passes through the agricultural lands in the north central portion of the North of Desert Center Alternative site (see Photo 2 above) may provide for wildlife movement across the site through the fallow agricultural lands to the east and west connecting undeveloped or undisturbed lands on either side of the North of Desert Center Alternative site.

Vegetation Communities Fallow agriculture, Sonoran creosote bush scrub, desert saltbush scrub, and desert dry wash woodland are the four primary vegetation communities

on the North of Desert Center Alternative site, although some active agriculture and developed land is present.

Fallow agriculture occurs on approximately 3,750 to 4,250 acres (approximately 63 to 71%) of the North of Desert Center Alternative site (see Photo 4 below). It contains still-visible furrows and irrigation tubing. This community supports very sparse growth of creosote bush (*Larrea tridentata*), along with a few jojoba (*Simmondsia chinensis*), which may have been the plant being farmed. Among the sparsely growing shrubs, minimal cover of annual species such as Mediterranean grass (*Schismus* sp.; a non-native species), cryptantha (*Cryptantha* spp.), and desert sunflower (*Geraea canescens*) are present.

Sonoran creosote bush scrub occurs on approximately 1,100 to 1,600 acres in the central and western portions of the North of Desert Center Alternative site and supports varying densities of creosote bush and desert saltbush (*Atriplex polycarpa*) as well as sparse to moderate cover of annual plant species such as desert Indian wheat (*Plantago ovata*), cryptantha, and Mediterranean grass (see Photo 5 below).

Desert saltbush scrub occurs on approximately 140 to 240 acres of the northeastern portion of the North of Desert Center Alternative site and is dominated by desert saltbush with an occasional creosote bush. Mediterranean grass is common in the open areas between shrubs (see Photo 6 below).

Desert dry wash woodland occurs on approximately 180 to 280 acres in the large wash that passes through the north-central portion of the North of Desert Center Alternative site (see Photo 2 above). This community is dominated by blue palo verde (*Cercidium floridium*), desert ironwood (*Olneya tesota*), creosote bush, and desert saltbush and supports a number of annual plant species such as cryptantha, phacelia (*Phacelia* spp.), Mediterranean grass, devil's lantern (*Oenothera deltoides*), desert Indian wheat, and browneyes (*Camissonia claviformis*).

A small area of the North of Desert Center Alternative site is active agriculture (a palm tree farm) east of State Route 177. Developed land on the North of Desert Center Alternative site consists of State Route 177 and a convenience store.

Special status species observations have been reported to the CNDDB within 5 miles of the North of Desert Center Alternative site (Table 2). These CNDDB records include one listed plant species, the federally listed endangered Coachella Valley milk-vetch and one non-listed, special status species, Emory's crucifixion-thorn (*Castela emoryi*; CDFG 2009). The CNDDB includes a record of the desert tortoise approximately 3,500 feet northeast of the North of Desert Center Alternative site on National Park Service land, and critical habitat for the desert tortoise is located approximately 0.9 mile west of the North of Desert Center Alternative site.

Alternatives Table 2
California Natural Diversity Database Records for Special Status Species within Five Miles of the North of Desert Center Alternative Site

Common Name *Scientific Name*	Status State/Fed/CNPS/BLM	Occurrence Within 5 Miles of North of Desert Center Alternative Site
PLANTS		
Chaparral sand-verbena *Abronia villosa var. aurita*	--/--/List 1B.1/--	Reported approximately 1.5 miles southwest of the site.
Coachella Valley milk-vetch *Astragalus lentiginosus var. coachellae*	--/FE/List 1B.2/--	Reported on site in 1978 along Desert Center Rice Road (State Route 177).
Crucifixion thorn *Castela emoryi*	--/--/List 2.3/--	Reported in the westernmost portion of the site in 1996.
Las Animas colubrina *Colubrina californica*	--/--/List 2.3/--	Reported approximately 3.5 miles west of the site.
Alverson's foxtail cactus *Coryphantha alversonii*	--/--/List 4.3/--	Reported approximately 1 mile west of the site.
California ditaxis *Ditaxis serrata var. californica*	--/--/List 3.2/--	Reported approximately 4 miles northwest of the site.
Cove's cassia *Senna covesii*	--/--/List 2.2/--	Reported approximately 4 miles northwest of the site. Alternative site may be too low in elevation for this species.
ANIMALS		
Prairie falcon *Falco mexicanus*	--/--/--/--*	Reported approximately 2 to 3 miles west of the site and approximately 0.75 mile northeast of the site.
Desert tortoise *Gopherus agassizii*	ST/FT/--/S	Reported adjacent to or within the northern and eastern portion of the site.
Nelson's bighorn sheep *Ovis canadensis nelsoni*	--/--/--/S	Reported approximately 3.5 miles northwest of the site and 2.5 miles northeast of the site.

*Formerly a California Species of Special Concern but no longer is of special status. Source: CDFG 2009.

Status Codes (Source: CDFG 2009):

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

State SE - State listed endangered ST = State listed threatened SSC = Species of special concern

California Native Plant Society (CNPS)
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)

U.S. 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>

In addition to the species reported to the CNDDB within 5 miles of the North of Desert Center Alternative site, there are other special status species that have been observed

on the Proposed Project site or have been reported to the CNDDB within 5 miles of the Proposed Project site that have potential to occur on the North of Desert Center Alternative site. A list of all species with their potential to occur (or presence) on the Proposed Project site and the North of Desert Center Alternative site is provided as Appendix A.

While there are no CNDDB records for any of the special status species observed on the Proposed Project site (except desert tortoise) within 5 miles of the North of Desert Center Alternative site, there is some potential for all of the species except the Mojave fringe-toed lizard and chaparral sand-verbena to occur on (or migrate through in the case of the Swainson's hawk, Vaux's swift, and purple martin) the North of Desert Center Alternative site, particularly in the native vegetation communities. The Mojave fringe-toed lizard and chaparral sand-verbena require habitats that are not present on the North of Desert Center Alternative site.

There are other special status plant and animal species with potential to occur on the North of Desert Center Alternative site (Appendix A), but the primary species of concern is the federal and state listed threatened desert tortoise. The desert tortoise has moderate potential to occur in Sonoran creosote bush scrub habitat in the southwestern portion of the North of Desert Center Alternative site. The potential to occur is moderate because this habitat area is connected to more undisturbed habitat to the west and ultimately to desert tortoise critical habitat that is approximately 0.9 mile west of the North of Desert Center Alternative site. There is no agricultural land or other disturbance or impediment to movement between the habitat area on the North of Desert Center Alternative site and the critical habitat.

Furthermore, the desert tortoise has moderate potential to occur in the desert dry wash woodland on the North of Desert Center Alternative site (and one area of Sonoran creosote bush scrub immediately south of the woodland) because the woodland habitat continues, undisturbed, to the northwest and connects to other undisturbed habitats that ultimately connect to the aforementioned critical habitat or areas where the desert tortoise has been reported to the CNDDB.

Environmental Impacts

Construction. It is assumed that the entire North of Desert Center Alternative site and all of the vegetation communities on it (i.e., fallow agriculture, Sonoran creosote bush scrub, desert saltbush scrub, desert dry wash woodland, active agriculture, developed) as well as some potential jurisdictional areas (e.g., desert dry wash woodland and disturbed wetland) would be permanently lost as a result of vegetation clearing, grading, and construction of the solar facilities potentially affecting special status plant species, particularly Coachella Valley milk-vetch and Emory's crucifixion thorn. However, some of the potential jurisdictional areas, in particular the large wash dividing the northern portion of the site from the southern portion of the site would be avoided when siting the facility.

Few impacts to special status animal species would be expected because the North of Desert Center Alternative site is largely fallow agricultural land. However, the burrowing owl, which is known to use agricultural land for foraging, may be affected if present. Burrowing owl numbers have been markedly reduced in California for at least the past 60 years. Conversion of grasslands, other habitat destruction, and poisoning of ground

squirrels, has contributed to the reduction in numbers in recent decades, which was noted in the 1940s and earlier. Within the past 20 years, however, and particularly within the past 5 years, the decline of the burrowing owl in California appears to have greatly accelerated. Apparently, this has resulted because of habitat loss caused by increased residential and commercial development (California Public Utilities Commission 2008b). Although the CNDDB does not show any record of the burrowing owl within 5 miles of the North of Desert Center Alternative site, it has been observed breeding on the Proposed Project site (EDAW AECOM 2009) approximately 5.5 miles northwest of the North of Desert Center Alternative site. The species may occur on the North of Desert Center Alternative site since appropriate habitat is present, and it could be impacted by development of a solar project on the site.

Additionally, desert tortoise has been reported to the CNDDB approximately 2 to 3 miles west of the North of Desert Center Alternative site and approximately 0.75 mile northeast of the North of Desert Center Alternative site. As described above, the desert tortoise has moderate potential to occur in desert dry wash woodland and Sonoran creosote bush scrub on the North of Desert Center Alternative site. Since these communities would be impacted, there is potential for the desert tortoise, if present, to be impacted as well.

Furthermore, there is some potential for Harwood's milk-vetch, northern harrier, loggerhead shrike, American badger, and desert kit fox (among other species that could be present; see Appendix A) to be impacted on the North of Desert Center Alternative site because potential habitat for these species is also present and would be impacted, although the amount of potential habitat is less than on the Proposed Project site.

Because the primary wash would be avoided, impacts to wildlife movement across the site in desert dry wash woodland that connects undeveloped or undisturbed lands on either side of the North of Desert Center Alternative site, would be reduced. However, the east-west connectivity would still potentially be disrupted due to the construction on either side of the wash.

Additional impacts to vegetation communities, and possibly special status species, would occur due to the construction of linear facilities (e.g., transmission lines) associated with a solar project on the North of Desert Center Alternative site.

General Construction Impacts to Wildlife. Any wildlife residing on the North of Desert Center Alternative site would potentially be displaced, injured, or killed during project construction activities. Animal species in the project area could fall into construction trenches, be crushed by construction vehicles or equipment, or be harmed by project personnel. In addition, construction activities may attract predators or crush animal burrows or nests.

Migratory/Special Status Bird Species Impacts. The North of Desert Center Alternative site provides foraging, cover, and/or breeding habitat for migratory birds. Project construction could impact nesting birds in violation of the Migratory Bird Treaty Act.

Spread of Noxious Weeds. Construction of a solar project at the North of Desert Center Alternative site could result in the introduction and/or dispersal of invasive or

exotic weeds. The permanent and temporary earth disturbance adjacent to native habitats increases the potential for exotic, invasive plant species to establish and disperse into native plant communities, which leads to community and habitat degradation.

Excessive Noise. Noise from construction activities on the North of Desert Center Alternative site 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 activities could reduce the reproductive success of nesting birds.

Operational Impacts. Operation of transmission lines associated with a solar project on the alternative site could result in increased avian mortality due to collision with the new transmission lines.

An increased incidence of accidental wildfire is also a possibility during operation (although the potential is low) from downed transmission lines. Additionally, there would be the potential for edge effects to special status animal species in surrounding habitat areas from operational night lighting or noise. Furthermore, the desert tortoise could be subjected to increased predation from common ravens (*Corvus corax*; that were observed during the reconnaissance on alternative site), which may increase in numbers due to an increase in perching and nesting sites provided by project facilities. Desert tortoise could also be hit by vehicles and injured or killed.

Comparison to Proposed Project. Definitive conclusions about the amount of potential adverse impacts to biological resources in the absence of site-specific survey and project design information for the North of Desert Center Alternative site cannot be made. However, development of a solar project at the North of Desert Center Alternative site would impact fewer biological resources compared to the Proposed Project site because development of the Desert Center Alternative site would occur primarily on fallow agricultural land, whereas development of the Proposed Project site would occur primarily on land supporting native vegetation communities.

While a number of special status plant and animal species have been reported to the CNDDB within 5 miles of the North of Desert Center Alternative site, only two were actually reported on the North of Desert Center Alternative site, and only one with real potential to occur and be impacted is a listed species (i.e., desert tortoise with moderate potential to occur in desert dry wash woodland and Sonoran creosote bush scrub). The Proposed Project site and Applicant Reconfigured Alternative site, however, are known to support nine special status species (not including those species observed in migration only) including the desert tortoise.

Cultural Resources

Environmental Setting. The North of Desert Center Alternative is composed largely of private properties (agricultural land) but also includes undeveloped BLM land, and some County of Riverside land. The alternative site is located along Desert Center Rice Road (State Route 177) east of Kaiser Road, north of Oasis Road, and approximately 1.6 miles north of I-10 in Riverside County, California. While the alternative site is only 12 miles northwest of the PSPP, the environmental setting varies, in that nearly 70% of the

land proposed for the North of Desert Center Alternative is disturbed by past and current agricultural operations. The remaining landscape is similar to the PSPP and consists of desert washes, sandy dunes, and lower alluvial fan sediments. Major water sources are limited to the Colorado River, which lies approximately 50 miles east of the alternative site. However, when rainwater exceeds evaporation and occasional flooding occurs, Palen Lake (approximately 12 miles east of the alternative) will fill, creating a temporary water source. The Colorado Desert has a long and culturally rich past beginning thousands of years ago and continuing through the World War II desert training activities.

The following paragraphs from *Cultural Resources Class III Report for the Proposed Palen Solar Power Project, Riverside County, California* (Tennyson and Apple, 2009) and *Palen Solar Power Project Application for Certification, Volume I* (AECOM, 2009) provide a brief cultural context for the North of Desert Center Alternative.

The Colorado Desert contains a wealth of prehistoric archaeological sites and has been intensively studied by archaeologists for more than 80 years. Precise chronometric dating of archaeological materials in the Colorado Desert is limited due to the lack of sites with substantial subsurface components (Schaefer 1994a, 1994b). The site assemblage of the Colorado Desert is particularly diverse when it comes to sites associated with what might generally be termed ritual events. In addition to the remains of Native American habitations and resource procurement activities, there are abundant earth figures and shrines, petroglyphs and pictographs, and a well preserved trail system (Altschul and Ezzo 1994; Cachora 1994; Johnson 1985; McGuire and Schiffer 1982; Pendleton et al. 1986; Pigniolo et al. 1997; Rogers 1939; Schaefer 1994a, 1994b; von Werlhof 1987).

While the Colorado Desert region has been heavily researched, little is known about the Chuckwalla Valley. Early inhabitants of the area appear to have been highly mobile, especially in the late prehistoric and protohistoric period. Various cultural groups may have used the area at various or concurrent times, including the Chemeheuvi, Mojave, Cahuilla, Halchidhoma, and Quechan (Bean 1978; Kelly and Fowler 1986; Laird 1976).

The first recorded explorer of the interior Colorado Desert region was Father Eusebio Francisco Kino, a Jesuit missionary, cartographer, and explorer. Starting in 1691, Kino established a string of missions in northern Mexico and southern Arizona, finally reaching the Colorado River in 1702. Almost 70 years later, Father Francisco Garcés followed Kino's route. Garcés' party crossed the Colorado River and traveled west through the desert until the San Jacinto Mountains were visible in the distance, before returning to Sonora. Three years later, Father Garcés and a Spanish border captain named Juan Bautista de Anza attempted an overland route to Monterey (Rice et al. 1996). Garcés' route across the desert became part of what is known as the Old Spanish Trail, an important transportation link between New Mexico and California.

In the 1800s, most travel from Arizona to central California followed Anza's route. The discovery of gold in California brought a great influx of American and European settlers to the State. Between 1849 and 1860 an estimated 8,000 emigrants crossed the Colorado Desert on their way to California.

Significant economic development of the Colorado Desert region began in the 1870s and came to fruition in the early part of the 20th century. Development was dependent largely on two things: transportation and water. The first of these came in 1872, with the construction of the Southern Pacific Railroad from Los Angeles to present-day Indio and, eventually, Yuma. The Southern Pacific Railroad reached Yuma on September 30, 1877. The railroad was the single most important boost to mining in the southeastern Colorado Desert, offering convenient transportation of heavy mining equipment, supplies, personnel, and bullion.

In the 1930s, the Metropolitan Water District was created to effect transport of water from the Colorado River to the coastal regions of southern California. The Colorado River Aqueduct was constructed from Parker Dam through the mountains east of Indio to Riverside, and finally, to Lake Matthews in western Riverside County. It was the largest construction project in the world at the time and provided jobs during the depression.

During WWII, shortly after the bombing of Pearl Harbor and the U.S. entry into the war, a Desert Training Center (DTC) was established in southeastern California, Arizona, and Nevada to train U.S. troops in the event they would be sent to North Africa to fight the Germans. The DTC was the largest training installation ever created (approximately 26,000 square km [16,156 square miles]). Its purpose was to train soldiers for the harsh conditions of North Africa as well as field test equipment and supplies. The original facility extended from the Colorado River on its eastern border to just west of Desert Center, California and from Searchlight, Nevada in the north to Yuma, Arizona in the south. Further information regarding this region can be found in the **Cultural Resources** section of the RSA.

Staff of Applied EarthWorks, Inc. conducted a records search for the North of Desert Center Alternative at the Eastern Information Center of the California Historical Resources Information System on February 16, 2010. The records search indicated that a total of nine surveys had been conducted within a one-mile radius of the alternative site. Of these, four surveys included minor portions of the proposed alternative site. The records search documents two sites (one prehistoric habitation site and one historical ceramic cup fragment) within a one-mile radius of the alternative site. No previously recorded sites have been documented within the North of Desert Center Alternative.

Less than 1% of the North of Desert Center Alternative appears to have been subject to reliable pedestrian surveys. No cultural resources were documented during these surveys. Because so little of the alternative site has been surveyed, the lack of known sites is not a reliable indicator for the archaeological potential of the alternative site. As previously mentioned, a large portion of the alternative site is devoted to and disturbed by agricultural activities. While much of the surface prehistoric archaeology has been impacted, an aerial review of the alternative site suggests that the potential for prehistoric sites would be greater in the northwestern portion of the alternative, due to the proximity of available water. However, intact sites are likely buried and would not be identified through surface inventory. The remaining areas are located within a landscape context that has a low to moderate potential for intact prehistoric surface and subsurface archaeological sites.

Environmental Impacts. There are currently no documented archaeological sites that would be impacted by the construction and operation of a solar facility on the site of the North of Desert Center Alternative. However, the majority of the alternative site has yet to be subject to pedestrian survey. As discussed, the alternative site is only 12 miles northwest of the PSPP.

While the environmental setting varies between the alternative and proposed project (the bulk of the alternative is used for agricultural purposes), type and density of archaeological sites that might occur within the alternative can be predicted based on what was discovered at the PSPP. The majority of the sites identified during the archaeological survey of the PSPP was from the historic period and associated with military use of the area. Less than 20% of the sites discovered were prehistoric and consisted of lithic scatters, hearth features, and one temporary camp. The archaeological information from the proposed project and the known military use of the North of Desert Center Alternative suggest that the alternative would contain similar site types and density as the proposed project. However, due to the impact of agricultural activities within the alternative, potential archaeological sites discovered on the surface of agricultural land would be within a disturbed context. Any sites found as a result of the complete pedestrian survey of the alternative would need to be evaluated for CRHR/NRHP eligibility. If any of the archaeological sites are found to be eligible for the CRHR/NRHP, a solar facility on the North of Desert Center Alternative would have potential impacts on historically significant resources.

There are a number of visible built environment resources (buildings and structures) in and near the North of Desert Center Alternative. Date of construction of these buildings and structures is unknown. If further study of the resources reveals the structures are more than 45 years of age, the structures would need to be evaluated for CRHR/NRHP eligibility. If any of the resources are found to be eligible for the CRHR/NRHP, a solar facility on the North of Desert Center Alternative would have potential for physical and visual impacts on historically significant resources.

Comparison to Proposed Project. While the North of Desert Center Alternative contains nearly the same acreage as the PSPP (5,000 vs. 5,200), the development of a solar facility on the alternative site appears to have the potential for far fewer cultural resource impacts than those of the PSPP. However, the alternative site has not been subject to a complete pedestrian survey, which would potentially identify currently unreported cultural resources. The area of the alternative is in a landscape context that is roughly equivalent to that of the PSPP where prehistoric archaeological sites were scarce and the majority of archaeological sites was from the historic period and associated with military use. However, it should be noted that archaeological sites discovered within the disturbed agricultural context would likely not meet the criteria for CRHR / NRHP inclusion when evaluated. A complete archaeological and built environment survey of the North of Desert Center Alternative would be required to reveal more site-specific information about cultural resources and serve to better qualify or verify this comparison.

Hazardous Materials

Environmental Setting. The topography of the North of Desert Center Alternative site is essentially flat, as are the immediately surrounding areas. Sensitive receptors are

present within the North of Desert Center Alternative and a residential community is located south of the southwest corner of the North of Desert Center Alternative site.

Access to the North of Desert Center Alternative would likely be via Interstate 10 to the Rice Road (SR 177) exit. At Rice Road, transport would turn northeast for approximately 2 miles through primarily rural residential land.

Environmental Impacts. Hazardous materials use at the North of Desert Center Alternative, including the quantities handled during transportation and disposal, would be the same as those of the proposed project. As stated in the **Hazardous Materials** section for the proposed project, hazardous materials used during the construction phase of the project would include heat transfer fluid (HTF), diesel fuel, mineral insulating oil, lube oil, and small quantities of solvents and paints. No acutely toxic hazardous materials would be used on site during construction, and none of these materials pose a significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical states, and/or their environmental mobility.

Hazardous materials will be used and stored on site during the operation of the project, including 1.3 million gallons of HTF in the solar trough system. As stated in the **Hazardous Materials** section, Therminol VP1 is the HTF that will be used in the solar panels to collect solar heat and transfer it in order to generate steam to run the steam turbines. Therminol is a mixture of 73.5% diphenyl ether and 26.5% biphenyl, and is a solid at temperatures below ~54 °F. Therminol can therefore be expected to remain liquid if a spill occurs. While the risk of off-site migration is minimal, Therminol is highly flammable and fires have occurred at other solar generating stations that use it. Isolation valves would be placed throughout the HTF piping system designed to automatically block off sections of the piping in which a loss of pressure is detected (Solar Millennium 2009a). It appears that the placement of additional isolation valves in the HTF pipe loops throughout the solar array would add significantly to the safety and operational integrity of the entire system by allowing a loop to be closed if a leak develops in a ball joint, flex-hose, or pipe, instead of closing off the entire HTF system and shutting down the plant. In order to ensure that HTF leaks do not pose a significant risk, a condition of certification which would require the project owner to install a sufficient number of isolation valves that can be either manually or remotely activated would be required, as with the proposed PSPP.

LPG or propane would be used at the proposed PSPP to fuel the auxiliary boilers and HTF heaters. LPG is composed mostly of propane and butane and poses a fire and explosion risk (not a risk of toxicity) because of its flammability. Up to 36,000 gallons (76,000 lbs) of LPG would be stored in two 18,000-gallon carbon steel tanks equipped with secondary containment structures. The applicant stated that despite the large amounts of LPG (propane) stored at the PSPP, a Risk Management Plan (RMP) including an Off Site Consequence Analysis (OCA) is not required due to its use as a fuel (Solar Millennium 2009a).

The predominant risk of storing and using large amounts of LPG at the power plant is that of fire and explosion. Accordingly, the risks are discussed in the **Worker Safety/Fire Protection** section of this RSA along with staff's proposed mitigation. This

discussion would be similar for the North of Desert Center Alternative site, as the climate and fire risk are similar and the North of Desert Center Alternative is closer to a regional fire department.

Transportation of hazardous materials to the North of Desert Center Alternative site would require passing near residences located in Desert Center. The transportation would be on Interstate 10 and Rice Road, not on smaller road with residences.

Comparison to Proposed Project. The hazardous materials that would be used at the North of Desert Center Alternative site would be the same as those used at the proposed PSPP site; however, the North of Desert Center Alternative site has a greater number of sensitive subgroups or residences. As such, the potential impacts at the North of Desert Center Alternative would likely be somewhat greater than at the proposed site. With adoption of the proposed conditions of certification, the Desert Center Alternative would comply with all applicable laws, ordinances, regulations, and standards (LORS) and result in no significant impacts to the public.

Land Use

Environmental Setting. The North of Desert Center Alternative would be located on approximately 6,000 acres and would require the ground disturbance of approximately 3,000 acres. It is located in eastern Riverside County, north of the I-10. The site consists of primarily fallow agricultural land. Approximately 320 acres of active agriculture (palm date orchard) occurs in the southeastern section of the Alternative but this would be avoided. The North of Desert Center Alternative is crossed by the SCE 161 kV transmission line and by Rice Road (SR 177). The North of Desert Center Alternative is outside the Desert Center Policy Area and was zoned as Agriculture and Open Space Rural (Riverside County 2003).

The North of Desert Center Alternative is located north of Desert Center, in eastern Riverside County. The surrounding area consists of primarily undeveloped desert land and the rural community of Desert Center. The Desert Lily Preserve ACEC is located immediately adjacent to the northeastern corner of the alternative site. Solar projects are proposed approximately 1 mile northwest of the alternative site (Eagle Mountain enXco) and approximately 0.5 miles south of the alternative site (Chuckwalla Sun Peak Solar). The Joshua Tree National Park is located approximately 1.5 miles north of the alternative site.

The North of Desert Center Alternative would be west of the Desert Center Airport. The Desert Center Airport is a private airport and is located within the Chuckwalla Valley

Raceway. The Chuckwalla Valley Raceway is a 400-acre racing facility that is under construction and includes the planned use of the airport amenities in its brochures (CWR 2010).

Agriculture. The North of Desert Center Alternative site is comprised of active and previously farmed agricultural lands. The active farms would be avoided; however, it is possible that construction impacts including noise and dust would create impacts. The North of Desert Center Alternative is not included in the land surveyed by the California Department of Conservation (DOC 2008). No soil mapping exists for this area. Fallow

agriculture occurs on approximately 3,750 to 4,250 acres (approximately 63 to 71%) of the North of Desert Center Alternative site. It contains still-visible furrows and irrigation tubing. No active agriculture lands would be needed for the Desert Center Alternative although the site would be located adjacent to a small palm tree farm east of Rice Road.

Sensitive Land Uses. As stated above, the Desert Center Alternative would be located north of Desert Center and surround scattered rural residences.

Transmission Interconnection. The transmission interconnection would trend southeast then south to reach the proposed Red Bluff Substation. It would be located partially within the CDD utility corridor and adjacent to the existing SCE 161 kV transmission line. The transmission line would be located primarily on open space and some agriculture land. No residences are located within 500 feet of the transmission interconnection.

Environmental Impacts. Because of the desire to consider use of disturbed lands for large solar projects, the North of Desert Center Alternative site is located primarily on inactive agricultural lands.

The construction and operation of the PSPP at the North of Desert Center Alternative site would avoid actively used agricultural land. However, the construction of the alternative would result in the permanent conversion of approximately 3,000 acres of land previously used for agriculture to renewable energy production. The construction and operation of the solar power plant would eliminate foreseeable future agricultural use on this site.

The United States Department of Agriculture (USDA), Natural Resource Conservation Service provides information on designation of soils in areas with agricultural lands (NRCS 2009). Because none of the site has been surveyed by the NRCS, the California Agricultural LESA Model could not be used to assess impacts to agriculture from use of the North of Desert Center Alternative site. Because neither the USDA nor the California Department of Conservation recognize the Desert Center region as an area designated for agriculture use, and because the alternative would avoid any actively farmed areas, the conversion of the previously farmed land to an industrial use is not considered significant.

Construction activities for the alternative would create temporary disturbance to residential areas (i.e., heavy construction equipment on temporary and permanent access roads and moving building materials to and from construction staging areas). Conditions of certification to reduce noise and air quality impacts are presented in the Noise and Air Quality sections of this RSA for the proposed Palen solar site. Because this disturbance would be temporary at any one location, the impacts would likely be less than significant.

Comparison to Proposed Project. Selecting the North of Desert Center Alternative site would not require the use of BLM land, and would not require a land use plan amendment. Use of the North of Desert Center Alternative site would result in greater impacts to agricultural land than the project site, although it would not result in impacts to active agriculture lands and it is not expected that it would result in a significant impact.

Recreation and Wilderness

Environmental Setting. The North of Desert Center Alternative would not be located adjacent to or near any wilderness areas. As such impacts to wilderness will not be addressed.

The North of Desert Center Alternative would be located approximately 1 mile east of the Chuckwalla Valley Raceway. The Chuckwalla Valley Raceway is a 400-acre road course racing facility with three road courses and is located at the Desert Center Airport (CVR 2010).

The alternative site would be located west of the Desert Lily Preserve ACEC, south of the Joshua Tree National Park, and north of the Chuckwalla Mountains Wilderness. The Desert Lily Preserve is a 2,031-acre ACEC designated for its botanical value.

Congress changed the status of the Joshua Tree National Monument to a national park in October 1994 (National Park Service, 2010). The 792,600-acre Joshua Tree National Park is managed by the National Park Service. Recreational activities available at the park include backpacking, camping, mountain biking, rock climbing, geologic tours, birding, horseback riding, and star gazing (National Park Service, 2010).

The 84,614-acre Chuckwalla Mountains Wilderness Area was designated by Congress in 1994, and is managed by the BLM, California Desert District. Recreational activities within this area include hiking, camping, and rock scrambling

Environmental Impacts. Because of the flat topography and the close proximity of the North of Desert Center Alternative to the Chuckwalla Valley Raceway, the solar power plant would be visible from the raceway.

Project construction activities would create a number of temporary conditions that may dissuade recreationists from visiting the Chuckwalla Valley Raceway. Noise, dust and heavy equipment traffic generated during construction activities would negatively affect a visitor's enjoyment of the recreation area. Disturbances to recreational activities would potentially cause a temporary reduction of visitation during construction activities.

A solar project at the North of Desert Center Alternative site would have an indirect impact on recreational users at the Desert Lily Preserve ACEC, Joshua Tree National Park, and Chuckwalla Mountains Wilderness due to the changes to the landscape in the immediate area, construction and operational noise, and overall change to the desert setting. Some proportion of recreational users may ultimately prefer to visit other areas due to the industrial views of the North of Desert Center Alternative project if located at this alternative site. To mitigate the potential negative effects of the changes to the viewshed, landscaping may be required, or recreational facilities that support these users may be improved or installed.

Comparison to Proposed Project. Both the North of Desert Center Alternative site and the PSPP site would be near to BLM ACECs and wilderness areas. However, while the alternative site would be near to the Chuckwalla Valley Raceway, impacts to recreation

would be slightly less at the alternative site because it would be located nearer to built environments than the proposed site and would not impact any OHV open routes as designated by the NECO Plant.

Noise and Vibration

Environmental Setting. Generally low levels of ambient noise are expected along the North of Desert Center Alternative as this region is primarily for agriculture and is undisturbed. However, ambient noise levels are expected to be elevated in the near future due to the presence of the Chuckwalla Valley Raceway immediately east of the alternative site. The Chuckwalla Valley Raceway is designed for automotive and motorcycle racing and it is expected that during racing events, the noise levels in the vicinity will be increased.

Nearby sensitive receptors include the rural residences within the North of Desert Center Alternative. The nearest residential area would be about 100 feet from the site. The nearest sensitive receptors to the proposed site are located within 3,500 feet from the project site.

Environmental Impacts. As stated in the **Noise** section of this RSA, the construction of the PSPP would create noise, or unwanted sound. The character and loudness of this noise, the times of day or night at which it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts.

The North of Desert Center Alternative site is located on land that was previously used for agriculture and that is primarily undisturbed. Additionally, the Desert Center Alternative is located adjacent to BLM open space. Scattered rural residences are located within 100 feet of the boundaries of the alternative. It is expected that operational noise would raise the ambient noise levels.

Comparison to Proposed Project. Building the PSPP at the North of Desert Center Alternative site would create a slightly greater impact than at the proposed site because of the closer proximity to a greater number of sensitive receptors (residences).

Public Health and Safety

Environmental Setting. The North of Desert Center Alternative site is located in an isolated area previously dedicated to farming and adjacent to BLM open space and private recreational areas. The nearest residences are located approximately 100 feet from the alternative site. There are no nearby schools or other sensitive receptors.

Environmental Impacts. While the meteorological conditions and topography at the site are not exactly the same as at the proposed PSPP site, they are similar enough that the results of air dispersion modeling and a human health risk assessment for the North of Desert Center Alternative site would be expected to be very similar to that for the proposed site. The cancer risk and hazard indices are much below the level of significance at the point of maximum impact, so the project would be unlikely to pose a significant risk to public health at this location.

One small wet cooling tower for each power block is proposed by the applicant to cool ancillary equipment. In addition to being a source of potential toxic air contaminants, the possibility exists for bacterial growth to occur in the cooling towers, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Additional information regarding legionellosis can be found in the **Public Health** section of the RSA. With the incorporation of conditions of certification such as those recommended in the **Public Health** section this impact would be less than significant.

Comparison to Proposed Project. There is no substantial difference between this location and the proposed site for public health.

Socioeconomics and Environmental Justice

Environmental Setting. Like the proposed PSPP site, the North of Desert Center Alternative site is located in Riverside County. The demographic characteristics of Riverside County are described in the **Socioeconomics and Environmental Justice** section of this RSA. The Regional Study Area and Local Study Area for the North of Desert Center Alternative would be similar as for the PSPP site as the sites are near each other. The environmental justice/demographic screening for the North of Desert Center Alternative includes the census block group data within the 6-mile radius considered for the proposed project. Please see the **Socioeconomics and Environmental Justice** section of the RSA for more detail regarding environmental justice impacts in this region.

Environmental Impacts. Construction workers would most likely be from larger nearby cities such as Blythe, Coachella, and Indio. While there is limited housing available in the vicinity of the Desert Center Alternative site, workers could commute from Blythe, approximately 50 miles east of the North of Desert Center Alternative site. There are residential opportunities or amenities in Blythe or in Coachella and Indio, 40 miles west of the alternative site, in addition to campgrounds, RV parks, or motels (Solar Millennium 2009a). Because it is unlikely that the construction workers would relocate to the immediate vicinity of the North of Desert Center Alternative site, this alternative would not cause a significant adverse socioeconomic impact on the area's housing, schools, police, emergency services, hospitals, and utilities.

There would be no adverse socioeconomic impacts since most of the construction and operation workforce is within the regional labor market area, and construction activities are short-term. Gross public benefits from the PSPP, including capital costs, construction and operation payroll, and sales taxes, should it be built at the North of Desert Center Alternative site, are likely to be similar to the benefits from PSPP at the proposed site, although some of the economic benefits would likely occur in Desert Center as well as in Blythe. Section 73 of the California Revenue and Taxation Code allows a property tax exclusion for certain types of solar energy systems installed between January 1, 1999 and December 31, 2016. The components that would be excluded include the solar components (mirrors, solar boiler, heat exchangers) in addition to the storage devices, power conditioning equipment, transfer equipment, and parts (Solar Millennium 2009a). As such, the property tax income would not be expected to increase significantly from its current state.

Comparison to Proposed Project. The socioeconomic impacts of the PSPP at the North of Desert Center Alternative site would be similar to building and operating the project at the proposed site.

Soil and Water Resources

Soils in the North of Desert Center Alternative site include primarily Rositas and Carsitas series. Other soil series mapped for the North of Desert Center Alternative include Vaiva, Quilotosa, Hyder, Cipriano, and Cherioni (Soil Survey Staff 2009). These soils are generally formed in mixed alluvium and in sandy deposits blown from alluvium (CPUC 2006). Soil types include sandy to coarse sandy loam, fine sand, stony sand, very gravelly coarse sand, and very stony coarse sand. Soils containing high percentages of fine sands and silt and that are low in density are generally the most erodible. These soil types generally coincide with soils such as young alluvium and other surficial deposits as within the alternative site (CPUC 2006). Approximately 3,000 acres of land on this alternative site would be disturbed by the construction.

The North of Desert Center Alternative site lies within the Chuckwalla Valley Groundwater Basin part of the Colorado River Hydrologic Region. The site is located on fallow agriculture land. A main wash crosses the northern section of the alternative site. This wash supports desert dry wash woodland and would be considered waters of the state under the jurisdiction of the CDFG and could potentially be considered waters of the U.S. under the jurisdiction of the ACOE. However, based on review of regional aerial photography, it does not appear that this wash is connected to any waters of the U.S. A focused delineation may be necessary to confirm that this is the case. Topography on the North of Desert Center Alternative site is relatively flat, with elevation ranging from approximately 500 to 700 feet above mean sea level, from the north to the south.

As with the proposed PSPP site, the North of Desert Center Alternative would use groundwater as the water supply.

Environmental Impacts

Soil Erosion Potential by Wind and Water. As discussed in the **Soils and Water** section of this RSA, construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation and water-dependent 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 loading to nearby receiving waters. Although access to the site would be from existing roads, construction of the solar fields would require substantial grading as in the proposed project. While the volume of earth movement required at the alternative site is unknown, the topography and slope of the North of Desert Center Alternative site are less severe than at the proposed PSPP site.

Being situated in a flat area downstream of a major desert wash, portions of the Desert Center Alternative would be subject to sediment deposition and flooding from large floods on crossing the site. This impact would primarily affect the project itself, but the

adverse effect could be significant. It may not be possible to practically mitigate this impact except by mapping and avoiding the severe hazard areas, which would result in a smaller alternative.

As at the PSPP site, grading plans, a Storm Water Pollution Prevention Plan (SWPPP), and a Drainage Erosion and Sediment Control Plan (DESCP) would be required. Due to the flat terrain and existing disturbed condition of this site, the SWPPP and DESCP would likely be sufficient to mitigate soil erosion impacts to a level less than significant.

Project Water Supply. The North of Desert Center Alternative site would require the use of groundwater. It is unknown if there is sufficient groundwater available at the North of Desert Center Alternative; however, the alternative site has supported irrigated agriculture in the past, primarily jojoba. The analysis of the applicants proposed water use at the PSPP site suggests that Colorado River water may be withdrawn from production wells over the life of the Project. At present, it is unclear when and if the US Bureau of Reclamation will promulgate regulations concerning the identifying users of Lower Colorado River water. As with the proposed PSPP, this could occur at the North of Desert Center Alternative and a proposed condition of certification would require that the Project owner mitigate for any water use determined to come from the Colorado River.

Wastewater/Storm Water Quality. Storm water runoff from the site during construction and operation could have similar impacts as proposed for the proposed project. The site construction will require a SWPPP which will specify Best Management Practices (BMPs) to minimize or eliminate water contamination. Water quality impacts would likely not be significant.

As stated in the **Soil and Water** section of the RSA, the Land Treatment Unit (LTU) on the site, would be used for soil that is impacted with Therminol® VP1 HTF as a result of minor leaks or spills that occur during the course of daily operational or maintenance activities. At ambient temperatures, HTF is a highly viscous material that is virtually insoluble in water. Operation of an LTU is not expected to impact surface water or groundwater quality beneath the site. The LTU would be surrounded on all four sides by berms that would protect the LTU from surface water flow. Because of the viscous and insoluble nature of HTF, it is not likely to mobilize from the soil downwards to the water table. The LTU would be operated under the requirements of CCR Title 23, Division 3, Chapter 15 and Title 27, Section 2000 et seq. and Title 23, Section 2510 et seq. Further discussion regarding the HTF and any HTF leaks can be found in the **Soil and Water** section.

Sanitary waste disposal would likely be through on-site facilities as for the proposed project. No significant adverse impact is anticipated.

Comparison to Proposed Project. The level terrain with minimal existing drainageways on the North of Desert Center Alternative results in reduced impacts to hydrology, water use and water quality, as compared with the proposed project. As with the PSPP, a finding by the U.S. Army Corps of Engineers of whether the ephemeral drainages on the North of Desert Center Alternative site are jurisdictional waters of the U.S. would be

required. Without this determination, staff cannot determine whether the Project would comply with Section 404 of the Clean Water Act.

Traffic and Transportation

The North of Desert Center Alternative site is located north of I-10; access to the North of Desert Center Alternative site would be via Rice Road off of I-10. Workers employed to construct the project at this alternative site would most likely commute from Blythe (50 miles) or Coachella and Indio (up to 40 miles). Given the limited use of I-10 east of Palm Springs, added construction traffic on the I-10 would be unlikely to impact the level of service.

The North of Desert Center Alternative would be located approximately half of a mile west of the Desert Center Airport. The airport has one runway. It is a private airport and is located on the Chuckwalla Valley Raceway site (CVR 2010).

Environmental Impacts. Before construction could occur at the North of Desert Center Alternative site, a construction traffic control and transportation demand implementation program would need to be developed in coordination with Caltrans. This analysis may result in the need to limit construction-period truck and commute traffic to off-peak periods to avoid or reduce traffic and transportation impacts. These impacts would likely be similar to those of the proposed project as both projects would require the use of I-10 and other smaller roads for access and are located adjacent to each other.

Glare. When a parabolic trough rotates from the stowed position into the tracking position, a flash of brightness may occur for a short period of time. This rotation occurs at the beginning and end of daily operations. This flash of brightness can be classified as an intrusive bright nuisance and as an optical hazard at short distances. The North of Desert Center Alternative would be located adjacent to Rice Road. As such, there is the potential for diffuse glare from the project to affect nearby motorists. A Condition of Certification that requires mitigation in the form of physical screening (berms, fencing, landscaping, or similar means) along the length of the project adjacent to nearby roadways would reduce this impact.

The North of Desert Center Alternative has the potential to interfere with air traffic at Desert Center Airport, a private facility located approximately 1 mile east of the alternative site. Interference with air traffic could be caused by encroachment on restricted airspace; interference from electronic frequencies; glare; and upward air plumes.

Comparison to Proposed Project. Impacts to traffic and transportation at the North of Desert Center Alternative site would be similar to those at the proposed PSPP site; however, although the North of Desert Center Alternative would be immediately adjacent to Rice Road, it would be farther from the I-10 than the proposed PSPP site. For this same reason, potentially significant glare impacts to drivers along I-10 would be greater at the proposed PSPP site than at the North of Desert Center Alternative. The North of Desert Center Alternative would have a greater impact to the Desert Center Airport than the PSPP site.

Transmission Line Safety and Nuisance

Environmental Setting. The North of Desert Center Alternative site would connect with the SCE system at the proposed Red Bluff Substation through a new transmission line that would exit the alternative site and trend southeast for approximately 2.5 miles then turn south for approximately 2.1 miles The new transmission line would cross BLM land and active and fallow agricultural land and would be located adjacent to the existing SCE 161 kV transmission line for the first 2.4 miles.

The transmission line would not be within 500 feet of any residences.

Environmental Impacts. Similar to the proposed project, this alternative site would not be likely to cause transmission line safety hazards or nuisances with implementation of conditions of certification such as those described in the **Transmission Line Safety and Nuisance** section of the RSA. The potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current standard industry practices, and the potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards, while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route.

As with the proposed PSPP transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed lines' design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information.

Comparison to Proposed Project. While the electric and magnetic fields from the transmission line would be managed to an extent the CPUC considers appropriate, the transmission line would be located near approximately one residence. The transmission interconnection for the proposed site would not be located within 500 feet of any residential properties; as such, this impact would be greater for the Desert Center Alternative site than for the proposed site.

Visual Resources

Environmental Setting. The North of Desert Center Alternative site is located on primarily private land adjacent to BLM managed land north of Desert Center. The SCE 161 kV transmission line crosses the site from the northwest to southeast corner. The site is north of I-10 and east of Rice Road (Highway 177) and east of the Chuckwalla Valley Raceway, a 400-acre racing facility that is currently under construction and plans to open in the first quarter of 2010. This infrastructure introduces developed and industrial features to the otherwise visually open and rural setting. Some active agriculture (date palm orchards) occurs along the southeast corner of the project site.

Views from the North of Desert Center Alternative site to the north and west are of open space. Views to the east and south are pastoral, of agriculture lands, and the Chuckwalla Valley Raceway, currently under construction. The Joshua Tree National Park would have a distant view of the site as it is located approximately 1.5 miles to the northeast of the alternative site.

The linear facilities associated with the North of Desert Center Alternative site include a 230 kV transmission line approximately 4.6 miles long. The transmission lines would be partially located in a CDD Designated Utility Corridor.

Environmental Impacts. As stated in the **Visual Resource** section, the Energy Commission staff, in coordination with BLM, used a standard visual assessment methodology developed by California Energy Commission staff and applied to numerous siting cases in the past in this study. A description of this methodology is provided in **Appendix VR-1** for the proposed PSPP project**.**

Both the existing visible physical environmental setting and the anticipated visual change introduced by the proposed project are considered from representative, fixed vantage points. The likelihood of a visual impact is determined in this study by two fundamental factors: the susceptibility of the setting to impact as a result of its existing characteristics (reflected in its current level of visual quality, the potential visibility of the project, and the sensitivity to scenic values of its viewers); and the degree of visual change anticipated as a result of the project. These two factors are summarized respectively as *visual sensitivity* (of the setting and viewers), and *visual change* (due to the project).

With the addition of the project, views of the alternative site would change from an open and pastoral landscape to a substantially more industrial, highly altered one. The industrial landscape would be dominated by the thousands of acres of solar troughs, approximately 30-feet tall. There would be no natural features to block the view of the solar facilities on any side. However, the alternative site would be located adjacent to the newly constructed Chuckwalla Valley Raceway which would have already introduced some built environment into the area.

The North of Desert Center Alternative site would be prominently from I-10 for both westbound and eastbound traffic. Travelers would be approximately 1.8 miles south of the project, and there is little elevation or natural contouring to block views of the solar field. The PSPP would be located over between 0.2 and 1 mile from the I-10.

The alternative site would be potentially visible in the distance from the Joshua Tree National Park and Desert Lily Preserve ACEC as they are elevated. The landscape north of I-10 and Desert Center is within the central portion of Chuckwalla Valley and is flat, exhibits a prominent horizontal line, and is relatively non descript. The more distant, angular mountains provide a backdrop of visual interest. Landform colors are tan to lavender and bluish hues for the more distant mountains. Vegetation is characterized by grass and low-growing shrubs with patchy to continuous distributions. Vegetative lines are irregular to distinct where defined by the line of the valley floor and roads. Vegetation colors range from tan to pale yellow for grasses and muted to dark greens

for shrubs. The overall landscape character and visual quality is predominantly natural in appearance with a few structures at Desert Center slightly visible above the vegetative line.

The alternative's 230 kV transmission line interconnection would introduce additional industrial character to this agriculture area; however, it would be partially located within a CDD Designated Utility Corridor and would be adjacent to an existing 161 kV transmission line for 2.5 miles.

Comparison to Proposed Project. The North of Desert Center Alternative site would have similar visual impacts as the proposed PSPP site. Both the proposed and alternative sites would be located next to some agriculture lands and some existing infrastructure, specifically highways and transmission lines. Additionally, both sites would be located near BLM open space, and north of a BLM wilderness area. However, the PSPP would be closer to the I-10 than the proposed site and would create somewhat greater visual impacts.

The North of Desert Center Alternative transmission line would create a similar visual impact as the PSPP proposed site transmission interconnection because of the near proximity of the transmission lines and the need to cross the I-10 to reach the substation. Both transmission lines would be adjacent to an existing 161 kV line and would be in a remote area with minimal viewers.

Waste Management

Environmental Setting. Two leaking underground fuel tank sites were identified south of the North of Desert Center Alternative, at the intersection of I-10 and Rice Road (SR 177) (Envirostor 2010). Additionally, as with the proposed PSPP site, the North of Desert Center Alternative region was used as part of General Patton's Desert Training Camps during World War II. Because the North of Desert Center Alternative site is located on previously farmed land, unexploded ordinances are unlikely on the majority of the alternative site. However, because the site was previously used for agriculture, it is possible that the site has been contaminated by agriculture residues.

As discussed in the **Waste Management** section of this RSA, preparation and construction of the two phases of the proposed solar project and its associated facilities would last approximately 3 years (39 months) and generate non-hazardous, universal, and hazardous wastes in solid and liquid forms. Construction activities would generate an estimated 40 cubic yards per week of non-hazardous solid wastes, consisting of scrap wood, concrete, steel, glass, plastic, paper, insulating materials, aluminum, and food waste. For all construction waste, recyclable materials would be separated and removed to recycling facilities; non-recyclable materials would be disposed of at a Class III landfill. Non-hazardous liquid wastes would be generated during construction, and would include storm water runoff, sanitary waste, dust suppression drainage, and equipment wash water.

During construction, anticipated hazardous waste includes empty hazardous material containers; solvents, used oil, paint, and oily rags; heat exchanger cleaning waste (chelant-type solution); and flushing and cleaning wash water. Estimated quantities are: one cubic yard of empty containers (per week), 175 gallons of solvents, used oil, paint,

and oily rags (every 90 days), 1,000 gallons of heat exchanger cleaning waste (once per power plant unit), and variable amounts of flushing and cleaning wash water. The hazardous wastes would be transferred to a Class I landfill that accepts hazardous wastes.

The proposed project would generate non-hazardous, universal, and hazardous wastes in solid and liquid forms under normal operating conditions. Table 5.16-6 of the project AFC gives a summary of the anticipated operation waste streams, estimated waste volumes and generation frequency, and proposed management methods.

Environmental Impacts. Both nonhazardous and hazardous wastes would be created by the construction of the project at the North of Desert Center Alternative site in similar quantities as at the proposed site and would be disposed of at the same facilities as for the proposed project. The applicant would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction and would be required to comply with conditions of certification similar to those identified for the proposed site. The project at either the PSPP site or the North of Desert Center Alternative site would produce minimal maintenance and plant wastes.

All nonhazardous wastes would be recycled to the extent possible, and nonrecyclable wastes would be regularly transported off site to a local solid waste disposal facility. Generation plant wastes include oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse generated by workers. All construction and operation activities would need to be conducted in compliance with regulations pertaining to the appropriate management of wastes.

The total amount of nonhazardous waste generated from the project during operation is estimated to be 40 cubic yards of non-hazardous solid waste per week during operation including 1,500 cubic yards of soil contaminated with HTF at less than 10,000 milligrams per kilogram (per year). The disposal of the solid wastes generated by the PSPP facility can occur without significantly impacting the capacity or remaining life of any of these disposal facilities. The California Department of Toxic Substances Control (DTSC) has indicated that site-specific data will be required to verify that HTF-contaminated soil may be classified as non-hazardous and treated on site (Solar Millennium 2009a).

Like nonhazardous wastes, hazardous wastes would be recycled to the extent possible. Project operations would generate hazardous wastes including: used hydraulic fluid, oils, and grease associated with the HTF system, turbine, and other hydraulic equipment; effluent from the oily water separation system resulting from plant wash down; oil adsorbent and oil filters; spent carbon from air pollution control of the HTF vent; soil contaminated with HTF as a result of solar array equipment leaks; and spent lead acid batteries. Spills of project HTF used during project operations may result in soils contaminated with high levels of HTF. Soil contaminated with HTF at a concentration greater than or equal to 10,000 milligrams per kilogram (or other threshold value to be determined by DTSC) would be considered hazardous waste and would be collected on site and transported by a licensed transporter to and disposed of at a Class I landfill or

licensed recycling facility. Conditions of Certification similar to those required for the proposed project would be required for the alternative to reduce impacts to less than significant.

Comparison to Proposed Project. The environmental impacts of waste disposal at the Desert Center Alternative site would be similar to those at the proposed PSPP site.

Worker Safety and Fire Protection

Environmental Setting. The North of Desert Center Alternative site would be located within an area that is primarily agricultural. The area is currently served by the Riverside County Fire Department. The two nearest county fire stations are RCO Station #49, located 1mile west of the alternative site (4 miles by road), and RCO Station #87, located approximately 50 miles west of the alternative site and would respond to hazardous materials incidents at the alternative site as well (RCFD 2010a). The Worker Safety and Fire Protection section in this RSA provides more information regarding the Riverside County Fire Department. The fire risks of this alternative site would be similar to those of the proposed PSPP site as both have desert conditions.

Environmental Impacts. A solar plant at the North of Desert Center Alternative site would require a Project Demolition and Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program in order to ensure adequate levels of industrial safety. The applicant would also be required to provide safety and health programs for project construction, operation, and maintenance, similar to the requirements for the proposed project site. The Riverside County Fire Department would be contacted to assure that the level of staffing, equipment, and response time for fire services and emergency medical services are adequate.

Comparison to Proposed Project. The environmental impact of worker safety and fire protection at the North of Desert Center Alternative site would be slightly better than at the proposed site due to its proximity to the RCO Station #49.

Engineering Assessment for Desert Center Alternative

Facility Design

The design of a 500 MW project at the North of Desert Center Alternative would be similar to that of PSPP at the proposed site. Staff-recommended measures may be appropriate to ensure compliance with engineering laws, ordinances, regulations, and standards applicable to the design and construction of the project.

Geology, Paleontology and Minerals

Environmental Setting. The North of Desert Center Alternative is located near the southwestern edge of the Chuckwalla Valley near the Chuckwalla Mountains to the south. Geologic units underlain by the alternative site are recent dune sand (Qs), recent alluvium (Qal), and nonmarine sedimentary deposits (Qc and Qco). The alternative route is primarily underlain by young alluvium with interfingering pockets of older fan deposits (Qc and Qco).

The North of Desert Center Alternative is located in an area of low seismic activity. No active faults cross the alignment or are located in the vicinity. The estimated peak

horizontal acceleration for this alternative route is less than 0.2 g; therefore, this area should not experience strong groundshaking. The lack of strong groundshaking and deep groundwater elevations preclude liquefaction-related phenomena. This alternative is located on flat to gently sloping alluvial fans and alluvial plains that are not susceptible to landslides (CPUC 2006).

One mineral resource site is located approximately 1 mile south of the alternative site, a talc-soapstone surface mining operation that is no longer in operation. No other mineral resources are identified in the area (CPUC 2006).

Environmental Impacts. Minimal seismic ground shaking is expected at this alternative site because it is not located within a seismically active area and is not on a known fault line. The severity and frequency of ground shaking associated with earthquake activity at the North of Desert Center Alternative site is expected to be similar to that of the proposed site. As such, similar design criteria would be required for the North of Desert Center Alternative site in accordance with a design-level geotechnical report and California Building Code (2007) standards. Adequate design parameters for the facility would need to be determined through a site-specific evaluation by a Certified Engineering Geologist or Geotechnical Engineer. Impacts due to seismic hazards and soil conditions, such as subsidence, would be addressed by compliance with the requirements and design standards of the California Building Code. The potential for liquefaction in this area is low due to anticipated depths of groundwater. Additionally, as the site has been previously used for agriculture and irrigated in most areas, loose deposits of soils are unlikely as the project site has already been subject to long-term wetting.

The paleontological sensitivity and potential to encounter significant paleontological resources at this alternative site and the PSPP site is similar. As stated in the **Geology, Paleontology, and Minerals** section, construction of the proposed project will include grading, foundation excavation, utility trenching, and possibly drilled shafts. There exists the probability of encountering paleontological resources. As with the proposed project site, the proposed conditions of certification are designed to mitigate any paleontological resource impacts to a less-than-significant level.

Comparison to Proposed Project The North of Desert Center Alternative site is subject to a similar risk of geologic hazards as the proposed project site. Although not expected, strong ground shaking could be effectively mitigated through facility design. The potential to encounter geologic resources and significant paleontological resources at the alternative site is similar to the PSPP site. The conditions of certification provided in the **Geology, Paleontology and Minerals** section would be applicable to the North of Desert Center Alternative site.

Power Plant Efficiency

The plant configuration and solar trough technology that would be employed at the North of Desert Center Alternative site would be similar to the proposed project, which means it would result in similar consumption of fuel, and it would result in a similar level of efficiency.

Power Plant Reliability

The plant configuration at the North of Desert Center Alternative site would be similar to the proposed project, which means it would result in similar levels of equipment availability. Plant maintainability, fuel and water availability, and reliability of the plant in relation to natural hazards would each be similar at this alternative site to the proposed project.

Transmission System Engineering

Locating a solar facility at the North of Desert Center Alternative site would require a shorter connector line than at the proposed site. Once collected, the power would interconnect with the proposed Red Bluff Substation. As such, the transmission system evaluation for the North of Desert Center Alternative site would be similar to that of the proposed PSPP.

Summary of Impacts – Desert Center Alternative

The Desert Center Alternative site would have impacts similar to the proposed PSPP site for 11 of the 20 environmental and engineering resource elements discussed above: air quality, public health, socioeconomics, transmission line safety and nuisance, waste management, facility design, geology, paleontology and minerals, power plant efficiency, power plant reliability, and transmission system engineering.

The proposed PSPP site could result in fewer impacts than the Desert Center Alternative site in four resource elements: hazardous materials, noise, traffic and transportation for impacts to airports, and visual resources.

The North of Desert Center Alternative site could result in fewer impacts than the proposed PSPP site for seven resource elements: land use, recreation and wilderness, soils and water, worker safety and fire protection, transportation and traffic for glare, biology, and cultural resources. Impacts to biological and cultural resources are anticipated to be reduced at the North of Desert Center Alternative site compared to at the PSPP site because the North of Desert Center Alternative site would be located on disturbed land and would avoid major washes. This would lessen the amount of sensitive species habitat that would be lost due to the construction of the project and would potentially lessen impacts to cultural resources. However, without having completed detailed site surveys of biological and cultural resources at the North of Desert Center Alternative site, a detailed comparison is not possible. Nevertheless, for most of these impacts, staff has proposed conditions of certification that, if implemented, would reduce the proposed project's impacts to less than significant.

Finally, as stated above, the North of Desert Center Alternative is made up of approximately 151 parcels with 40 land owners. Due to the number of parcels that would have to be acquired, this alternative would make obtaining site control more challenging in comparison to obtaining a right-of-way grant for use of BLM administered land at the PSPP site. In addition, detailed site engineering and transmission interconnection would require additional time for this site to be developed; as a result this alternative would not meet the project objective requiring that a decision to be made in 2010.

B.2.8 ALTERNATIVES CONSIDERED BUT NOT EVALUATED IN FURTHER DETAIL

B.2.8.1 SITE ALTERNATIVES

This section considers potential alternatives to the proposed PSPP that were evaluated, and determined to not be feasible or result in lesser impacts than the proposed action. Because these alternatives would not avoid or substantially reduce the adverse impacts of the proposed PSPP or because they do not meet project objectives, the purpose and need for the project, or are otherwise not reasonable alternatives, they are not analyzed in further detail in this RSA. The following alternative sites were evaluated in this analysis:

- Cibola Alternative
- Palen Pass Alternative
- Desert Center Alternative
- Palo Verde Alternative

Cibola Alternative

The Cibola Alternative was identified by the applicant in the AFC as a potential alternative site for the proposed project. The Cibola Alternative is located on private land owned by the Metropolitan Water District of Southern California and public land managed by the Department of Interior. The private land is located west of the Palo Verde Hodges Drain, on undisturbed land. It is located south of Blythe, Riverside County; see **Alternatives Figure 4**. The elevation of the Cibola Alternative is between approximately 300 and 500 feet above sea level. The alternative site is made up of 29 parcels with two separate land owners. Approximately 6,700 acres were identified by the applicant for this alternative site; however, it is assumed that approximately 4,000 acres of land would be required for the alternative.

Cibola was not pursued by the applicant as a possible site for the proposed project because it had a lower-voltage transmission line crossing the site from north to south and was privately owned. Additionally, the site was crossed by several large washes and had excessive slope, between 2 to 4%.

Environmental Assessment. As with the proposed Palen solar site, the Cibola Alternative site would require use of approximately 3,000 acres of land and would result in the permanent loss of approximately 2,800 acres of desert habitat. The project would require grading of approximately 2,800 acres and it is expected that because of the extensive grading, the alternative site would result in impacts to biological and cultural resources. While the project would be on private land, this land has not been previously disturbed and includes three large desert washes running east west throughout the site.

Both the proposed PSPP site and Cibola site would have a large footprint and require extensive grading, potentially resulting in erosion and runoff. Additionally because the Cibola site has a greater slope than the PSPP site, it is expected that a greater amount of earth movement would be required. The Cibola site is crossed by three large desert washes, potentially increasing the sediment flow in and around the site. Given the size

of the power plants and the approximately 30-ft tall solar trough structures, visual impacts would be considerable and similar to those at the proposed Palen solar site. The Cibola site would be visible from the Mule Mountains to the west.

Rationale for Elimination. The Cibola site is located on undisturbed private land and is located on approximately 29 parcels but with only two landowners. This alternative would not reduce impacts of the proposed PSPP without creating severe impacts of its own. Therefore, the Cibola Alternative was eliminated from further consideration in this RSA.

Palen Pass Alternative

The Palen Pass Alternative was identified by the applicant in the AFC as a potential alternative site for the proposed project. The Palen Pass Alternative is located on BLM land north of Desert Center, adjacent to Highway 177, in Riverside County; see **Alternatives Figure 4**. The elevation of Palen Pass Alternative is between approximately 500 and 700 feet above sea level. The site is located east of the Joshua Tree National Park. The Joshua Tree National Park is nearly 800,000 acres large and is used for hiking, mountain biking, rock climbing, and includes nine campgrounds.

Rationale for Elimination The Palen Pass Alternative was not found to be a reasonable alternative for the proposed project because in August of 2008, the BLM indicated that the Palen Pass region was in an area that would potentially be subsumed in expansions of the Joshua Tree National Park and/or the McCoy Wilderness (AECOM 2010a). In the fall of 2008, the BLM rejected the application for ROW grant for the use of the Palen Pass region (AECOM 2010a).

Desert Center Alternative

The Desert Center Alternative was identified by the applicant in the AFC as a potential alternative site for the proposed project. The Desert Center Alternative is located primarily on federal land managed by the BLM, and is located west of the town of Desert Center in eastern Riverside County; see **Alternatives Figure 4**. The elevation of Desert Center Alternative is between approximately 800 to 1,000 feet above sea level. The site is made up of 103 parcels and is owned by 53 separate landowners including the BLM. The site would be located on 10,900 acres. The applicant submitted a right-of-way grant application to the BLM for use of the Desert Center Alternative in July 2008. In August 2008, the BLM indicated that this alternative was largely within a Desert Wildlife Management Area (DWMA) [AECOM 2010a].

Desert Center Alternative was not pursued by the applicant as a possible site for the proposed project because it was partially located in the Chuckwalla DWMA, which is managed as an Area of Critical Environmental Concern for recovery of the desert tortoise, as designated by the BLM Northern and Eastern Colorado Desert Coordinated Management Plan (NECO). The BLM established the Chuckwalla DWMA to protect federally listed desert tortoise and 38 special status plant and animal species and included the specific feature of a 1% surface disturbance limitation on federal lands within DWMAs. The U.S. Fish and Wildlife Service designated the area as Critical Habitat for the desert tortoise and BLM designated it as an Area of Critical Environmental Concern (BLM 2002).

Rationale for Elimination. The locations of portions of the Desert Center Alternative are within the Chuckwalla DWMA would make it an unacceptable alternative. In addition, the site is located on private and public land with approximately 53 owners. Due to the number of parcels that would have to be acquired to accommodate a 500 MW alternative on this site, this alternative would make obtaining site control more challenging (in comparison to obtaining a right-of-way grant to use BLM land). The potentially more severe impacts of this site result in it being eliminated from further consideration in this RSA.

Additionally, the Chuckwalla Valley Alternative was not found to be a reasonable alternative for the proposed project because the land classification of the alternative site within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality [43 U.S.C. 1781 (b)] in conformance with applicable statutes, regulations, policy and land use plan would preclude solar energy facilities.

Palo Verde Alternative

The Palo Verde Alternative was identified by the applicant in the AFC as a potential alternative site for the proposed project. The Palo Verde Alternative is located on public and private land west of Blythe, in Riverside County; see **Alternatives Figure 4**. The elevation of Palo Verde Alternative is between approximately 300 to 500 feet above sea level. The applicant stated that the total acreage for the Palo Verde Alternative is 3,800 acres (AECOM 2010a). The Palo Verde Alternative site is made up of 12 parcels and is owned by 8 separate landowners including the BLM. In July 2008, the applicant applied for a right-of-way grant for the Palo Verde Alternative. In the fall of 2008, the BLM rejected the Palo Verde Alternative site as the application was third in line as two separate applicants had already submitted right-of-way grant applications (AECOM 2010a).

The Palo Verde Alternative was not pursued by the applicant as a possible site for the proposed project because it was located on private land that was used for agriculture and the applicant stated that it was not clear if the private land could be bought under the needed lease or purchase option.

Environmental Assessment. As with the proposed PSPP site, the Palo Verde Alternative would require use of approximately 3,000 acres and would result in the permanent loss of desert habitat. The project would require grading of approximately 2,800 acres and it is expected that due to the extensive grading requirement, building the PSPP at the alternative site would likely result in impacts to biological and cultural resources.

Impacts to land use and recreation at the Palo Verde Alternative would potentially be significant as it is located adjacent to the Mule Mountain ACEC and would require use of some agriculture lands in the Palo Verde Valley region. Because it is immediately south of several rural residences, impacts to public health, noise and visual resources would potentially be worse than the proposed site.

Both the proposed PSPP site and Palo Verde Alternative site would have a large footprint and require extensive grading, potentially resulting in erosion and runoff. The Palo Verde Alternative site is crossed by ephemeral waters and washes that would likely be rerouted. As stated above, Palo Verde Alternative site is south of several residences

and would likely be visible from these residences. Given the size of the power plants and the approximately 30-ft tall solar trough structures, visual impacts would be considerable and similar to those at the proposed PSPP site.

Rationale for Elimination. The Palo Verde Alternative site is located on private and public land with approximately 8 owners. Due to the number of parcels that would have to be acquired to accommodate a 500 MW alternative on this site, this alternative would make obtaining site control more challenging (in comparison to obtaining a right-of-way grant to use BLM land). The applicant would have to negotiate separately with multiple landowners. The Draft Phase 2a Report published by the Renewable Energy Transmission Initiative (RETI) in early June 2009 identified private land areas suitable for solar development only if there were no more than 20 owners in a 2-square-mile (1,280-acre) area.

This alternative would not reduce impacts of the proposed PSPP without creating significant impacts of its own. Therefore, the Palo Verde Alternative was eliminated from further consideration in this RSA.

Additionally, in the fall of 2008, the BLM rejected the application for a right-of-way grant at the Palo Verde Alternative site because it was third in line (AECOM 2010a). As discussed earlier, under its existing regulations, it is BLM practice to determine if competing applications exist for the same facility or system. Applications that are first in time are given priority in consideration and are not considered competing applications with those filed later in time. Therefore, an alternative site on BLM land with a pending application, such as the Palo Verde Alternative, would not be a reasonable alternative for the proposed PSPP project unless that other application is rejected or withdrawn.

B.2.8.2 ALTERNATIVE SOLAR GENERATION TECHNOLOGIES

In addition to the range of alternative sites discussed earlier, several alternative solar generation technologies were evaluated as potential alternatives to the proposed PSPP (which would use the solar trough technology). Although alternative solar generation technologies would achieve most of the project objectives, each would have different environmental or feasibility concerns. The following solar generation technologies are considered in this analysis:

- Stirling energy systems technology
- solar power tower technology
- linear Fresnel technology
- photovoltaic technology

Among the solar thermal technology alternatives, the linear Fresnel alternative has the potential for least impacts due to its more compact configuration (reducing ground disturbance); however, the technology is proprietary and is not available to other developers. The distributed solar alternative would have fewer impacts than the proposed project because it would be located on already existing buildings or on already disturbed land. However, achieving 500 MW of distributed solar PV or solar thermal would depend on additional policy support, manufacturing capacity, and lower cost than currently exists to provide the renewable energy required to meet the

California Renewable Portfolio Standard requirements so additional technologies, like utility-scale solar thermal generation, are also necessary.

The following analyses assumed that the alternative technologies would be implemented on the site for the proposed PSPP, in eastern Riverside County.

Alternatives Table 3
Summary Characteristics of Utility Scale Solar Technologies

Technology	Parabolic trough	Solar Power Tower	Stirling Engine	Linear Fresnel	Photovoltaic
Water Use/100 MW (Assumes dry cooling)	~65 AFY	~20 AFY	~5 AFY	~12 AFY	~2-10 AFY
Acres per MW	6-7	10	9	4	8-12
Low impact construction possible	No	Yes	Yes	No	Uncertain
Tallest component (does not include cooling towers or Transmission Line)	25 feet – trough	300-650 feel	38 feet – engine	56 feet	10-5 feet (+ inverter station)
Slope requirements	2% or less	5% or less, can use LID	6% or less, can use LID	1% or less	3% or less, can use LID
Siting restrictions	Troughs are 1300 ft long, requires contiguous land	Heliostats must be in concentric circles around power tower	Can be sited in irregular shapes	Requires rectangles, requires contiguous land	Can be sited in irregular shapes
Heat Transfer Fluid (do not include water)	Yes	No	No	No (water used)	No

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 and occupy a maximum horizontal space of approximately 1,135 square feet (0.026 acres), with an anchored footprint of 12.5 square feet (assumed 4-foot diameter caisson). See **Alternatives Figure 5** for an illustration. 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.

In general, the Stirling system requires 7 to 9 acres of land per MW of power generated. Based on literature search, a 500 MW Stirling engine field would require from 3,500 acres to 4,500 acres of land. The two proposed solar thermal power plants using Stirling engine technology currently being considered by BLM and the Energy Commission, SES Solar 1 and 2, have a land use per MW of installed capacity of approximately 8.3 acres per MW, and would require a greater footprint than the PSPP.

Site preparation involves sinking a cement base with an embedded pedestal to support the dish (SES 2008). Each Stirling dish generates 25 kilowatts (KW) of power, so 20,000 dishes would be required to generate 500 MW. Each dish includes two major elements:

- **Solar Concentrator.** Large parabolic concentrators include 89 mirror facets attached to a frame by three point adjusting mounts (SES 2008). They are designed in five subassembly units for ease of transport and installation on site. Two small motors are attached to the pedestal and programmed to swivel the dish on two axes, following the sun's progress across the sky during the day.
- **Power Conversion Unit.** The Stirling engine's cylinder block incorporates four sealed cylinder assemblies along with coolers, regenerators, and heater heads (SES 2008). Concentrated solar energy heats up self-contained gas (hydrogen) in the power conversion unit, causing the gas to expand into the cylinders, moving the cylinders, and generating electricity. This cycle is repeated over and over as the engine runs at a steady rate of 1,800 rpm (SES 2008). Power is generated by heat transfer from the concentrated solar rays to the working gas in the engine's heater head, which converts the heat energy into mechanical motion.

The generator of each unit in a utility-scale project is connected by underground transmission line to a small substation where the power can be transformed into a higher voltage for more efficient transmission across the grid.

Environmental Assessment. The land area required for a 500 MW Stirling engine power plant is greater than that required for the proposed PSPP. 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 PSPP site is crossed by several desert washes, the installation of 20,000 Stirling engines could require a larger total acreage of land, resulting in a greater loss of habitat.

Stirling engines systems require minimal water use during operations. The SES Solar Two, a 750 MW project using the SunCatcher technology, would require approximately 32.7 acre feet per year. This technology would require less water than the proposed solar trough technology.

Due to the size and height of the Stirling mirrors, impacts to visual resources would be similar or greater to those of the PSPP. The 20,000 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-10 for commuting workers during both construction and operation.

Summary of Impacts. The large area needed for a Stirling engine power plant would be greater than the land requirement for the PSPP. Although grading requirements for the Stirling engines and solar concentrators are relatively small, grading for access

roads would be extensive because access roads are required for every other row of Stirling engines (SES 2008). For these reasons, recreation and land use, and biological resources impacts would be similar to those of the PSPP 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 30-foot high solar troughs. However, the Stirling technology does not require a turbine and would use less water than the PSPP.

Rationale for Elimination

Stirling engine systems are a viable renewable technology and would potentially increase the footprint of the project between 10 and 45%. Additionally, due to its greater height, it would potentially increase visual impacts. With a minimum size of nearly 4,500 acres, Stirling engine technology would not eliminate any of the significant impacts of the PSPP plant. Therefore, this alternative technology was eliminated from further consideration in this RSA.

Solar Power Tower Technology

The solar power tower technology converts thermal energy to electricity by using heliostat (mirror) fields to focus energy on a boiler located on power tower receivers near the center of each heliostat array. Each mirror tracks the sun during the day. The heliostats would be 7.2 feet high by 10.5 feet wide. See **Alternatives Figure 5** for an illustration. The solar power towers can be up to 600 feet tall with additional 10-foot tall lightening rods. The solar power tower would receive heat from the heliostats then convert the heat into steam by heating water in the solar boilers. A secondary phase would convert the steam into electricity using Rankine-cycle reheat steam turbine electric generator housed in a power block facility at each of the plants.

In general, a solar power tower power plant requires 5 to 10 acres of land per MW of power generated. A 500 MW solar power tower field would require from 2,500 acres to 5,000 acres of land. The proposed solar power tower plant currently being considered by BLM and the Energy Commission, Ivanpah Solar Electric Generating System, is using approximately 10 acres per MW, and would require a greater footprint than the PSPP.

Site preparation involves grading at the base of the heliostat and grading the access roads required for maintenance. Each heliostat field has the following primary components.

- **Heliostats.** The heliostat mirrors are arranged around each solar receiver boiler. Each mirror tracks the sun throughout the day and reflects the solar energy to the receiver boiler. The heliostats are approximately 7.2 feet high by 10.5 feet wide. They are arranged in arcs around the solar boiler towers asymmetrically.
- **Power Tower.** Tower structure height is up to 459 feet. Primary thermal input is via solar receiver boilers, superheater and reheaters at the top of the distributed power towers.

- **Steam Turbine Generator**. The steam turbine system consists of a condensing steam turbine generator with reheat, gland steam system, lubricating oil system, hydraulic control system, and steam admission/induction valving.

Power will be generated by the STGs at 19 kV (hydrogen cooled) and then stepped up by transformers for more efficient transmission across the grid.

Environmental Assessment

The land area required for a 500 MW solar power tower plant is greater than that required for the proposed PSPP. Grading of permanent access roads would be required due to the need for regular washing of the mirrors. This grading would cause removal of vegetation. Additionally, because the proposed PSPP site is crossed by several desert washes, the installation of the heliostats and power towers could require a larger total acreage of land, resulting in a greater loss of habitat.

Due to the size and height of the solar power towers, up to 600 feet, and mirrors, impacts to visual resources would be greater than those of the PSPP and would introduce an industrial character to this site and the surrounding areas.

Because of the height of the solar power towers and the direction that the sun is reflected by the heliostats, there may be concerns regarding any nearby aviation operations or military operations. Power tower technology would need to be reviewed for consistency with the Compatibility Plan adopted by the Riverside County Airport Land Use Commission. Policy 4.3.7 of the Countywide Policies of the 2004 Riverside County Airport Land Use Compatibility Plan includes guidance on characteristics to be avoided including glare or distracting lights which could be mistaken for airport lights. The Compatibility Plan also prohibits any use which would cause sunlight to be reflected toward an aircraft engaged in an initial straight climb following takeoff or toward an aircraft engaged in a straight final approach toward a landing at the airport.

While the solar power tower technology built at the PSPP site would not be located in the military no fly/no build areas, it would be located adjacent to a DOD Airspace Consultation Area and conflicts with military operations may arise.

Rationale for Elimination

The large area needed for a solar power tower plant would be greater than the land requirement for the PSPP. Grading requirements for the solar power tower would be less than for the PSPP because the solar power tower technology does not require grading of the entire solar field; however, grading would still be required for the access roads in between the rows of heliostats. For these reasons, recreation and land use, biological resources, and cultural resource impacts would be similar to those of the PSPP. In addition, due to the extent of the facility and the height of the power towers, impacts to the Desert Center Airport would potentially be greater for this alternative.

Because no substantial reduction in impacts would occur under this alternative technology, the solar power tower technology was eliminated from further consideration in this RSA as an alternative technology.

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 collected in a piping system and delivered to steam drums located in a solar field and then transferred to steam drums in a power block (Carrizo 2007). The steam drums transferred to the power block will be used to turn steam turbine generators and produce electricity. The steam is then cooled, condensed into water, and recirculated back into the process.

In general, the linear Fresnel technology requires 4 to 5 acres of land per MW of power generated. A 500 MW solar linear Fresnel field would require approximately 2,000 – 2,500 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:

- **Compact Linear Fresnel Reflector (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 (Carrizo 2007). 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 (Carrizo 2007).
- **Receiver Structure.** The receiver structure is approximately 56 feet tall (Carrizo 2007). 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 (Carrizo 2007). The steam would drive turbines and produce electricity.

Rationale for Elimination

The Fresnel solar technology is a proprietary technology owned by Ausra, Inc. However, Ausra, Inc. has changed its focus to being a technology and equipment provider rather than an independent power developer and owner and will focus on medium-sized (50 MW) solar steam generating systems for customers including steam users, such as food processors, enhanced oil recovery firms, and utilities for power augmentation systems that deliver steam into existing fossil-fuel power plants. A project of 500 MW is theoretically possible, and would require smaller acreage per megawatt. However, at nearly 2,500 acres for 500 MW, this technology would not eliminate the significant impacts of the proposed solar trough technology at this site.

Solar Photovoltaic Technology – Utility Scale

A utility scale solar photovoltaic (PV) power generation facility would consist of PV panels that would absorb solar radiation and convert it directly to electricity. The definition of a utility scale photovoltaic project varies; for this analysis utility scale project would consist of any solar photovoltaic facilities that would require transmission to reach the load center, or center of use.

PV facilities have been suggested using two general technologies:

- Thin film installed on fixed metal racks, as proposed by First Solar (see **Alternatives Figure 6**)
- Crystalline silicon photovoltaics installed on fixed racks or on elevated groups of panels that track the sun. These technologies are available from companies such as SunPower and Amonix. SunPower's PowerTracker technology consists of a single-axis mechanism that rotates the PV panels to follow the sunlight. The Amonix technology allows tracking on two axes (see **Alternatives Figure 6**).

Examples of existing utility scale PV facilities are:

- El Dorado Energy (Boulder City, NV): First Solar built a 10 MW facility using thin film technology for Sempra Energy demonstrating the commercial viability of its technology. The facility consists of over 167,000 solar modules on 80 acres of land and was completed in December 2008. (Sempra 2008). Additionally, Sempra Generation will begin expanding the facility by 48 MW in January 2010. All 58 MWs would be purchased by PG&E (Sempra 2009).
- NRG Solar (Blythe, CA): NRG Solar acquired a 21 MW thin film PV project in Blythe, CA. Commercial operation of the facility began in December 2009 and the electricity generated by the project is being sold to SCE under a 20-year power purchase agreement (NRG 2009).

Because PV technologies vary, the acreage required per MW of electricity produced from a large solar PV power plant is wide ranging and likely to change as technology continues to develop. 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 (NRDC 2008c). Therefore, a nominal 500 MW solar PV power plant would require between 1,500 and 5,000 acres.

Utility-scale solar PV installations require land with less than 3% slope. Solar photovoltaics do not require water for electricity generation. Because some water will be required to wash the solar panels to maintain efficiency, approximately 2-10 AFY of water is estimated to be required for a 100 MW utility solar PV installation or 10 to 50 AFY for a 500 MW installation (NRDC 2008c). The SunPower-CA Valley Solar Ranch states that the facility would use approximately 11.6 AFY for a 250 MW PV facility, or approximately 24 AFY for a 500 MW PV facility (SLO 2009).

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 substantially taller (SLO 2009).

As with any large solar facility, additional operational components may be required. The SunPower-California Valley Solar Ranch would require operational components such as electrical equipment, collector power lines, access roads, a substation, an operation and maintenance building, and water tanks (SLO 2009).

Environmental Assessment. A utility scale solar PV facility would create a number of substantial adverse effects similar to those created by the proposed PSPP facility. If

utility scale solar PV technology were built at the PSPP site, approximately 1,500 to 5,000 acres may be required, depending on the technology. Because the proposed site is crossed by several desert washes, it is likely that additional acreage would be required to site the solar PV arrays away from the major washes. Additionally, because some solar PV technology requires ground surface with less than 3% slope, it is likely that the entire site would be graded, removing all vegetation from the area.

The size and height of the solar PV arrays would likely be visible from nearby areas, such as I-10, due to the large size of the solar PV facility. The facility would also be visible from the nearby recreation areas. The large number of solar PV arrays, access roads, and interconnection power lines required for a 500 MW solar facility would introduce prominent industrial features. However, the solar PV technology would not introduce components as tall as the 30-foot solar troughs. Additionally, because most PV panels are black to absorb sun, rather than mirrored to reflect it, glare and reflection would be lessened. As such, potential impacts to the Desert Center Airport would also be lessened.

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 only for washing the solar PV arrays. Approximately 24 AFY would be required, significantly less than for the proposed Palen solar trough technology (SLO 2009).

As with the solar trough technology, extensive grading would be required for some PV technologies. Because thin film solar PV facilities require land with only 3% slope and the solar panels are grouped more densely together, constructability would be challenging without significant grading. Additionally, many miles of permanent access roads would be required for washing and maintenance of the solar panels. The extensive grading would likely create air emissions and erosion concerns similar to those of the PSPP.

Summary of Impacts. The large land area required for PV development would result in similar impacts to recreation, land use, biological and cultural resources, and soil and water resources as to those of the Palen facility. A utility scale PV project would reduce impacts to glare and would require minimal water for washing of the PV panels.

Rationale for Elimination

While utility scale solar PV technology is a viable renewable technology, its use would not reduce major impacts of the PSPP facility because the extent of land and access roads required, and the more extensive grading and stormwater management system required. Due to its requirement for a nearly flat site, it would require similar grading as the Palen facility with similar air emissions and erosion potential. With a minimum size of at least 1,500 acres, solar PV technology would not eliminate the impacts of the PSPP associated with ground disturbance. Therefore, this alternative technology was eliminated from further consideration in this RSA.

Distributed Solar Technology

There is no single accepted definition of distributed solar technology. The *2009 Integrated Energy Policy Report* (IEPR) defines distributed generation resources as "grid-connected or stand-alone electrical generation or storage systems, connected to the distribution level of the transmission and distribution grid, and located at or very near the location where the energy is used."

Distributed solar facilities vary in size from kilowatts to tens of megawatts but do not require transmission to get to the areas in which the generation is used. Distributed solar generation is generally considered to use photovoltaic (PV) technology although at slightly larger scales it is also being implemented using solar thermal technologies. Both technologies are considered below.

Distributed Solar PV Systems

A distributed solar 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 such as parking lots or disturbed areas adjacent to existing structures such as substations. To be a viable alternative to the proposed PSPP, there would have to be sufficient newly installed panels to generate 500 MW of capacity.

California currently has over 540 MW of distributed solar PV systems which cover over 40 million square feet (CPUC 2009). During 2008, 158 MW of distributed solar PV was installed in California, doubling the amount installed in 2007 (78 MW), and with 78 MW installed through May 2009, installation data suggests that at least the same amount of MW could be installed in 2009 as in 2008 (CPUC 2009).

Rooftop PV systems and parking lot systems exist in small areas throughout California. Larger distributed solar PV installations are becoming more common. Examples of the different distributed PV systems are:

- Nellis Air Force Base (AFB, Nevada): Over 72,000 solar panels, generating 14 MW of energy, were constructed in 2007, by SunPower Corp. on 140 acres of Nellis AFB land (Whitney 2007). Energy generated is used at the Nellis AFB.
- Southern California Edison (Fontana, CA): SCE has installed over 3 MW of distributed solar energy in two phases on over 1 million square-foot commercial roof using thin film PV technology provided by First Solar. This is the beginning of a planned installation of 3.5 million PV panels that would generate 250 MW of capacity (SCE 2009).
- San Diego Gas & Electric (San Diego, CA): SDG&E's Solar Energy Project is designed to install up to 25 to 30 MW of solar PV, which would include PV installation on parking structures and tracking systems on open land (SDG&E 2010).
- Pacific Gas & Electric (San Francisco, CA): PG&E launched a 5-year program to develop 500 MW of solar PV power. The program would consist of 250 MW of utility-owned PV generation and an additional 250 MW to be built and operated by independent developers under a streamlined regulatory process. PG&E's program targets mid-sized projects, between 1 to 20 MWs, mounted on the ground or

rooftops within its service area. It was approved by the CPUC in April 2010 (PG&E 2010).

- City of San Jose (San Jose, CA): The City of San Jose is considering the development and implementation of 50 MW of renewable solar energy on city facilities and/or land (San Jose 2009). San Jose's Green Vision lays out a goal of achieving 100% of the city's electricity from renewable energy by 2020 and plans to implement strategies of a 24-month period to increase solar installations in San Jose by 15%. The City anticipates that City facilities with appropriate solar access including parking lots, garages, lands and landfills would be eligible for solar installation and San Jose received ARRA funding for the project.

Like utility-scale PV systems, the acreage of rooftops or other infrastructure required per MW of electricity produced is wide ranging. As stated above, California has approximately 40 million square feet (approximately 920 acres) of distributed solar PV accounting for 441 MW installed (CPUC 2008b). However, based on SCE's use of 600,000 square feet for 2 MW of energy, 150 million square feet (approximately 3,500 acres) would be required for 500 MW.

Riverside County is estimated to have the technical potential for over 3,000 MW of distributed solar PV (CEC, 2007b). However, distributed solar PV could be located throughout the State. The location of the distributed solar PV would impact the capacity factor of the distributed solar PV.[2] The capacity factor depends on a number of factors including the insolation[3] of the site. Because a distributed solar PV alternative would be located throughout the State, the insolation at some of these locations would be less than in the Mojave Desert. The Renewable Energy Transmission Initiative (RETI) assumed a capacity factor of approximately 30% for solar thermal technologies and tracking solar PV and approximately 20% capacity factor for rooftop solar PV which is assumed to be non-tracking, for viable solar generation project locations (B&V 2008; CEC 2009). Tracking distributed solar PV would have a higher capacity factor as well.

Distributed Solar Thermal Systems

Solar thermal technology, specifically Concentrated Solar Power (CSP) technology, has also been adapted for use at distributed locations. In August 2009, eSolar began operations of a new distributed solar power tower technology. 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 (eSolar 2009). An example of the eSolar system is the Sierra SunTower, located in Lancaster, CA, which produces 5 MW of energy for SCE on 20 acres of land (eSolar 2009). Each eSolar module locates one tower, one thermal receiver, and 12,000 mirrors on 10 acres of land and produces 2.5 MW of power. Additionally, eSolar has developed a larger module, a 46 MW CSP plant that would include sixteen towers, a turbine generator set, and a steam condenser which would be located on approximately 160 acres (eSolar 2009).

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[2] The capacity factor of a power plant is a percentage that tells how much of a power plant's capacity is used over time (CEC 2008a)

[3] Insolation is the total amount of solar radiation striking a surface exposed to the sky (CEC 2008a).

Another solar thermal technology, the solar trough technology, could also be used as distributed technology. Solar Millennium has stated that its technology could be used in conjunction with desalination plants and other industrialized activities and could be used in 20 MW blocks (Solar Millennium 2008).

Both the solar thermal technologies have been implemented recently and are described here as an example of the evolving distributed solar technologies.

Environmental Assessment

Installations of 500 MW distributed solar PV would require up to 150 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. As such, it is unlikely that the rooftop solar PV alternative would create erosion impacts. Some 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 be lessened. 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.

Consideration of CEQA

Reduction of Impacts. Distributed solar technology is assumed to be located on already existing structures or disturbed areas so little to no new ground disturbance would be required; there would be few associated impacts to biological and cultural resources. Additionally, impacts to soils and waters as well as visual resources would be reduced.

Meet Most Project Objectives. A distributed solar technology alternative, if constructed at 500 MW, would meet the CEC project objectives to operate 500 MW of renewable power in California capable of selling competitively priced renewable energy. The solar technology would not necessarily meet the objective to locate the facility in areas of high solarity, because the distributed technology could be located throughout the State.

Feasibility. The rate of PV manufacturing and installation is expected to continue to grow very quickly. However, given that there are currently only about 500 MW of distributed solar PV in California, the addition of an additional 500 MW to eliminate the need for the Palen Solar Power Project cannot be guaranteed. This 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. Challenges to an accelerated implementation of distributed solar PV are discussed below.

- **RETI Consideration of Subsidies, Tariffs, Cost, and Manufacturing.** The RETI Discussion Draft Paper *California's Renewable Energy Goals – Assessing the Need for Additional Transmission Facilities* published with the RETI Final Phase 2A Report (September 2009), addresses the likelihood of a scenario of sufficient distributed solar PV to remove the need for utility scale renewable development. This discussion paper identified the factors likely to influence the pace of large scale deployment of distributed solar PV: subsidies, feed-in tariffs, manufacturing and installation cost, and manufacturing scale-up.
- **Cost.** The 2009 IEPR states that solar PV technology has shown dramatic cost reductions since 2007, and is expected to show the most improvement of all the technologies evaluated in the 2009 IEPR model, bringing its capital cost within range of that of natural gas–fired combined cycle units. However, the CPUC *33% Renewables Portfolio Standard Implementation Analysis Preliminary Results* considered a number of cases to achieve a 33% RPS standard. The results of this study state that the cost of a high distributed generation case is significantly higher than the other 33% RPS alternative cases. The study explains that this is due to the heavy reliance on solar PV resources which are more expensive than wind and central station solar.
- **Tariffs.** Additionally, the IEPR discusses the need to adjust feed-in tariffs to keep downward pressure on costs. Feed-in tariffs should be developed based on the size and type of renewable resources, given that the cost of generating energy from a 100-MW wind farm is less than the cost of generating to ensure a good mix of new renewable energy projects. According to the report, differentiating feed-in tariffs by type and size can ensure a good mix of new renewable energy projects and avoid paying too much for some technologies and too little for others.
- **Limited Installations**. Examples of large scale distributed solar projects are still limited. In the spring of 2008, SCE proposed 250 to 500 MW of rooftop solar PV to be installed in 5 years. As of January 2010, SCE had installed only 3 MW. As the 2009 IEPR points out, the potential for distributed resources remains largely untapped and integrating large amounts of distributed renewable generation on distribution systems throughout the State presents challenges.
- **Electric Distribution System**. The State's electric distribution systems are not designed to easily accommodate large quantities of randomly installed distributed generation resources at customer sites. Accomplishing this objective efficiently and cost-effectively will require the development of a new transparent distribution planning framework.

The 2009 IEPR makes a number of recommendations to support the integration of distributed generation into the California grid, expand feed-in tariffs, and support the efforts to achieve the RPS goals as a whole. It also recommends supporting new renewable facilities and the necessary transmission corridors and lines to access the facilities.

The conclusion of this section is that, while it will very likely be possible to achieve 500 MW of distributed solar energy over the coming years, the very limited numbers of existing facilities make it difficult to conclude with confidence that it will happen within

the timeframe required for the PSPP. As a result, this technology is eliminated from detailed analysis in this RSA.

B.2.8.3 ALTERNATIVE RENEWABLE TECHNOLOGIES

Non-solar renewable generation technologies were considered as potential alternatives to the proposed project. The following renewable generation technologies were considered in this analysis:

- wind energy
- geothermal energy
- biomass energy
- tidal energy
- wave energy

The non-solar renewable technologies alternatives (wind, geothermal, biomass, tidal, wave) would either be infeasible at the scale of the PSPP, or would not eliminate significant impacts caused by the project without creating significant impacts in other locations. Specifically, wind energy that would be viable at some locations in Riverside County could create significant impacts to biological, visual, cultural, and water and soils resources.

Energy Capacity of Various Technologies. Because a solar project generates power only about 25% of each day, the amount of energy generated by the 500 MW PSPP is roughly equivalent a 140 MW geothermal or biomass facility would produce, because those facilities could generate power 24 hours a day. However, the PSPP would provide about 500 MW of capacity that coincides closely with peak demand. On a summer afternoon, a 500 MW solar project would make a significant contribution to peak demand. The 140 MW geothermal or biomass facility, while providing an equivalent amount of energy overall, would make a much smaller contribution to peak demand. In order to provide the same amount of capacity and the same contribution during peak periods, the generation from the 140 MW geothermal facility would have to be accompanied by power from a 320 MW gas-fired peaking power plant. The environmental impacts of both facilities would have to be considered to compare the solar project to geothermal or biomass technologies on that basis.

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% of the wind's kinetic energy into electricity. A single 1.5-MW turbine operating at a 40% capacity factor generates 2,100 MWh annually.

Wind turbines currently being manufactured have power ratings ranging from 250 watts to 5 MW, and units larger than 7 MW in capacity are now under development (AWEA 2008). The average capacity of wind turbines installed in the United States in 2007 was 1.65 MW (EERE 2008). The perception of wind as an emerging energy source reached a peak in the early 1980s, when wind turbine generators to convert wind power into electricity were being installed in California at a rate of nearly 2,000 per year. Progress slowed a few years later, however, as start-up tax subsidies disappeared and experience

demonstrated some deficiencies in design. At the present time, technological progress again has caught up, contributing lower cost, greater reliability, and reason for genuine optimism for this renewable energy source in the future.

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 (AWEA 2008).

San Gorgonio Pass. The San Gorgonio Pass, northwest of Palm Springs, is considered one of the best regions in California for producing wind energy. However, there is little undeveloped land remaining for expansion beyond the already existing wind farms (WAPA 2003). Because there is minimal expansion room, the wind industry is instead replacing the older turbines in the region with newer ones, called “repowering” (WAPA 2003). At one time, there were more than 4,000 turbines in the Pass but wind farm operators have been replacing smaller, less efficient machines with larger, more modern turbines that need less maintenance and that can harness more power (WAPA 2003).

Environmental Assessment. Wind turbines can create environmental impacts, as summarized below (AWEA 2008):

- Wind energy requires between 5 and 17 acres per MW of energy created. As such a nominal 500 MW power plant would require between 2,500 and 8,500 acres. However, wind turbine “footprints” typically use only 5% of the total area.
- 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 the 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.

Summary of Impacts. Approximately 2,500 to 8,500 acres of land would be required for a 500 MW wind electricity power plant, although this land would not be densely developed. While wind plants would not necessarily impact the same types of wildlife and vegetation as the PSPP plant, the significant acreage necessary for a 500 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.

Rationale for Elimination

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 PSPP. Additionally, it would not meet the project objective to construct a utility scale solar energy project. Therefore wind generation was eliminated from further consideration.

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 used to extract energy from the high-temperature water.

Geothermal plants account for approximately 5% of California's power and range in size from under 1 MW to 200 MW. California is the largest geothermal power producer in the United States, with about 1,800 MW installed capacity; in 2007, 13,000 gigawatt hours of electricity were produced in California (CEC 2008). Geothermal plants provide highly reliable baseload power, with capacity factors from 90 to 98%.

Geothermal plants must be built near geothermal reservoir sites because steam and hot water cannot be transported long distances without substantial thermal energy loss. Geothermal power plants are currently operating in the following California counties: Lake, Sonoma, Imperial, Inyo, Mono, and Lassen. The RETI Phase 1A Report (2008) estimated an incremental capacity of approximately 2,400 MW for the entire State by 2018.

Geothermal Alternative Scenario. Approximately 5-10 average-sized geothermal projects would be required to achieve 500 MW of geothermal energy. For example, the Geysers has a complex of 15 geothermal plants with a net generating capacity of 750 MW and occupy approximately 45 square miles, or 28,800 acres (Geysers, 2010). The amount of land required for a geothermal facility varies greatly. Five hundred MW of geothermal energy could require the use of many thousands of acres of land. However, the amount of ground disturbance on that area would be less than 10%. Additionally, while components of the power plant, cooling towers and brine ponds would likely be fenced, there would not likely be fencing required for the wells and well pads. In that 5-10 geothermal facilities would be required for provision of 500 MW, depending on the locations of the new facilities, more transmission lines and switchyards with corresponding potential impacts (i.e., biological, cultural, soil & water, land use, visual) may be required for grid interconnection, when compared to the proposed PSPP.

Environmental Assessment. Concerns regarding geothermal power plants include air quality, hazardous materials, and geology. Benefits from geothermal power plants include an increased reliability and less ground disturbance than some renewable resources, including solar.

Air Quality. Toxic air contaminants and odors would be emitted as a result of fuel combustion in construction-related equipment and vehicles and as a result of geothermal steam released during well testing. Hydrogen sulfide (H_2S) in geothermal steam is a toxic air contaminant and a colorless, flammable, poisonous compound with a characteristic rotten-egg odor. Ammonia also occurs in geothermal steam and is a toxic air contaminant with a pungent, penetrating odor. Ammonia is also a precursor pollutant to particulate matter in the ambient air. Releasing geothermal steam during well testing and development would cause substantial emissions of these toxic air contaminants

and odors over the construction phase. Aside from closely managing the well testing schedule, few mitigation options are available, and the impact of toxic air contaminants and odors during construction would be significant and unavoidable.

Extracting power from geothermal steam equipment can cause emissions of ammonia and H_2S, which are odors and toxic air contaminants present in the geothermal brine. Ammonia emissions also react with ambient air to form inhalable PM10, and H_2S in the atmosphere will oxidize to SO_2 and sulfuric acid. Without proper control, emissions of these contaminants would cause increased health risks, create objectionable odors, and cause or substantially contribute to violations of H_2S and/or PM10 ambient air quality standards. These contaminants would be emitted during any short-term commissioning activities or uncontrolled releases of geothermal steam, but these impacts would be less than significant because they would be short-term and managed in accordance with permitting requirements.

Ammonia and H_2S emissions could be avoided with sulfur control systems and use of an air-cooling system to reduce cooling tower drift. Commonly, water cooling causes the geothermal fluid entering the cooling tower to be emitted to the atmosphere as water vapor, which results in high levels of ammonia and H_2S in the vapor from the cooling tower. However, a binary cycle plant emits only fresh water vapor from the cooling tower. Cool geothermal brine is injected into the ground after the energy is extracted.

Hazardous Materials. Geothermal plants can also produce waste and byproducts that can have significant impacts. The most potentially harmful gas generally encountered in geothermal systems is H_2S, which at concentrations higher than 30 parts per million (ppm) is toxic (CEC 2003). It can cause a variety of problems including dizziness, vomiting, and eventually death if one is exposed for long periods of time. In concentrations above 100 ppm, H_2S can be fatal. H_2S is heavier than air and can accumulate in low-lying areas (equipment pits, ravines, and other depressions) and become concentrated over time.

H_2S releases could potentially be of concern during drilling, well testing, and plant start-up and shut-down operations, although recent technology improvements in atmospheric separators can significantly decrease emissions and noise during these operations. H_2S is now often abated at geothermal power plants, resulting in a conversion of close to 100% of the H_2S into elemental sulfur (GEA 2007). Since 1976, H_2S emissions have decreased from 1,900 pounds per hour to 200 pounds per hour despite an increase in geothermal power production from 500 MW to 2,000 MW (GEA 2007).

One additional concern regarding hazardous materials present in geothermal facilities includes the possibility for bacterial growth to occur in the cooling tower, including Legionella. Legionella is a type of bacteria that grows in water and causes Legionellosis, otherwise known as Legionnaires' disease. Untreated or inadequately treated cooling systems in the United States have been correlated with outbreaks of Legionellosis. These outbreaks are usually associated with building heating, ventilating, and air conditioning (HVAC) systems but it is possible for growth to occur in industrial cooling towers. In order to ensure that Legionella growth is kept to a minimum, mitigation would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are

maintained within the cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. With the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance.

Geology, Paleontology, and Minerals. Active seismicity and subsidence generally occur in areas with high levels of tectonic activity (e.g., volcanic regions, fault zones), which are the same areas in which geothermal resources occur; therefore, it is difficult to discern between power plant-induced and naturally occurring seismicity and subsidence. Drilling deep into the earth's crust to access high-temperature geothermal resources and subsequent re-injection of fluid into the geothermal reservoir may result in microearthquakes, which are generally below magnitude 2-3 on the Richter scale. These microearthquakes are typically centered on the injection site and are too low to be noticed by humans (Kagel 2007).

Land Use. Geothermal power projects require less ground disturbance than almost any other energy source, typically from about 0.2 to 0.5 acres per MW; however, geothermal plants must be built where the resource is since the steam cannot be piped long distances without significant heat loss. This results in a highly secure and predictable fuel supply and some inflexibility in siting. It may also result in a long interconnection requirement to reach a transmission system.

Because of the minimal ground disturbance required, impacts to biological resources and cultural resources would likely be minimized compared to the PSPP.

Reliability. Geothermal facilities may achieve a 95% or higher availability (CEC 2003). Because the geothermal steam is available throughout the day, geothermal facilities provide an adequate level of reliability throughout the entire day.

Rationale for Elimination

Geothermal generation is a commercially available technology and is important for California's renewable energy future because it provides baseload power that is available 24 hours a day. It also can be developed with substantially less ground disturbance than that needed for the PSPP, so impacts related to biological and cultural resources, water and soils resources, and traffic/transportation would be reduced. Generation of 500 MW of geothermal power at times of peak demand (to equate to the proposed solar project), would require development of several large geothermal facilities. Despite the encouragement provided by Renewable Portfolio Standard targets and ARRA funding, few new projects have been proposed in the past two years, and no geothermal projects are included on the Renewable Energy Action Team's list of projects requesting ARRA funds. Therefore, while the technology is feasible and additional development is expected, the technology is not retained for detailed analysis in this RSA because it would not meet the objective to allow permitting in 2010. Additionally, it would not meet the project objective to construct a utility scale solar energy project.

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% of the state's renewable electricity derives from biomass and waste-to-energy sources (CEC 2007). Most biomass plant capacities are in the 3- to 10-MW range and typically operate as baseload capacity. The average size of a sales generation biomass plant is 21 MW (CBEA 2008). 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% of the state's electricity, and landfill gas generation (260 MW) makes up about 0.75%. Existing landfills not now producing electricity from gas could add a maximum of about 170 MW of new generation capacity (CBEA 2008).

Environmental Assessment. 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.

Rationale for Elimination

Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW) and so could not meet project objectives. Additionally, it would not meet the project objective to construct a utility scale solar energy project. 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. Therefore, this technology is not analyzed in detail as an alternative to the PSPP project.

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.

Certain coastal regions experience higher tides than others. This is a result of the amplification of tides caused by local geographical features such as bays and inlets. In order to produce practical amounts of power for tidal barrages, a difference between high and low tides of at least 5 meters is required. There are about 40 sites around the world with this magnitude of tidal range. The higher the tides, the more electricity can be generated from a given site and the lower the cost of electricity produced. Worldwide, existing power plants include a 240-MW plant in France, a 20-MW plant in Nova Scotia, and a 0.5-MW plant in Russia (EPRI 2006).

Tidal Fences

Tidal fences are effectively barrages that completely block a channel. If deployed across the mouth of an estuary, they can be very environmentally destructive. However, in the 1990s, their deployment in channels between small islands or in straights between the mainland and islands has increasingly been considered a viable option for generation of large amounts of electricity.

The advantage of a tidal fence is that all the electrical equipment (generators and transformers) can be kept high above the water. Also, by decreasing the cross-section of the channel, current velocity through the turbines is significantly increased.

The United Kingdom is currently considering the feasibility of tidal energy across the Bristol Channel. The feasibility study began with the consideration of the Severn tidal barrage. The barrage would work similarly to a dam which generates hydro electric power by holding water back before it is allowed to flow at speed through a pipe at the base of the dam to drive the turbines (BBC 2007). Since then, alternative tidal projects have been proposed, including a tidal fence that would allow shipping to move freely and keep ports at Cardiff and Bristol open (BBC 2008). The results of the feasibility study are expected to be published in 2010; however, preliminary results from the Sustainable Development Commission confirmed the potential of the huge Severn tidal range to generate approximately 5% of United Kingdom's electricity (BIS 2009).

Tidal Turbines

Tidal turbines are the chief competition to the tidal fence. Looking like an underwater wind turbine, they offer a number of advantages over the tidal fence. They are less disruptive to wildlife, allow small boats to continue to use the area, and have much lower material requirements than the fence.

Tidal turbines function well where coastal currents run at 2 to 2.5 meters per second (slower currents tend to be uneconomic while larger ones stress the equipment). Such currents provide an energy density four times greater than air, meaning that a 15-meter-diameter turbine will generate as much energy as a 60-meter-diameter windmill. In addition, tidal currents are both predictable and reliable, a feature which gives them an advantage over both wind and solar systems. The tidal turbine also offers significant environmental advantages over wind and solar systems; the majority of the assembly is hidden below the waterline, and all cabling is along the sea bed.

There are many sites around the world where tidal turbines could be effectively installed. The ideal site is close to shore (within 1 kilometer) in water depths of about 20 to 30 meters. In April 2007, the first major tidal-power project was installed in the United States off New York City's Roosevelt Island (Fairley 2007). The Roosevelt Island Tidal Energy (RITE) project, completed the Phase 2 Demonstration at the end of 2008. This phase included operating six full-scale turbines and resulted in 70 MW hours of energy delivered to two end users (Verdant 2009). Phase 3 of the RITE project is currently underway, and Verdant Power applied to the Federal Energy Regulatory Commission for a pilot license in November 2008. If granted, this license would allow Verdant Power to build out the RITE Project in the east channel of the East River to a 30-turbine 1 MW pilot project and to commercially deliver the energy generated by the field (Verdant 2009).

Turbines such as those used in New York City use in-flow turbines, thereby lessening the environmental impacts. A study conducted in 2006, *System Level Design, Performance, Cost and Economic Assessment – San Francisco Tidal In-Stream Power Plant*, concluded that a tidal plant located under the Golden Gate Bridge could create approximately 35 MW of power with no significant impacts to the environment and recommended further research and development into both ocean energy technology and a pilot project in San Francisco (EPRI 2006a).

Environmental Assessment. Tidal technologies, especially tidal fences, have the potential to cause significant biological impacts, especially to marine species and habitats. Fish could be caught in the unit's fins by the sudden drop in pressure near the unit. The passageways, more than 15 feet high and probably sitting on the bay floor, could squeeze out marine life that lives there or alter the tidal flow, sediment build-up, and the ecosystem in general. Even the in-flow turbines can have environmental impacts on marine systems. The in-flow turbines off New York City underwent environmental monitoring for 18 months to ensure the turbines would not create environmental impacts to the river's marine wildlife. The results thus far show no observed evidence of increased fish mortality or injury; however, Verdant will continue to monitor activities during the Phase 3 build-out of the project to analyze impact from larger arrays (Verdant 2009). Also, depending on the location of the tidal technology, commercial shipping could be disrupted during construction.

The reduced tidal range (difference between high and low water levels) resulting from tidal energy generation can destroy inter-tidal habitat used by wading birds. Sediment trapped behind the barrage could also reduce the volume of the estuary over time.

Rationale for Elimination

Tidal fence technology is a commercially available technology in Europe, although limited to areas that are adjacent to a body of water with a large difference between high and low tides, and it creates significant environmental impacts to ocean ecosystems. In-flow tidal turbines are a relatively new technology and are not considered an alternative to the PSPP project because they are an unproven technology at the scale that would be required to replace the proposed project. Additionally, the environmental impacts of tidal turbines are still under review, as demonstrated by the pilot project under continued environmental monitoring in New York. Therefore, this technology is not analyzed in detail in this RSA as an alternative to the PSPP.

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° to 60° latitude range north and south. The power in the wave fronts varies in these areas between 30 and 70 kilowatts per meter (kW/m) with peaks up to 100 kW/m in the Atlantic southwest of Ireland, the Southern Ocean and off Cape Horn. Many wave energy devices are still in the research and development stage and would require large amounts of capital to get started. Additional costs from permitting and environmental assessments also make wave energy problematic (WEC 2007). 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. Three approaches to capturing wave energy are:

- **Floats or Pitching Devices.** These devices generate electricity from the bobbing or pitching action of a floating object. The object can be mounted to a floating raft or to a device fixed on the ocean floor.
- **Oscillating Water Columns.** These devices generate electricity from the wave-driven rise and fall of water in a cylindrical shaft. The rising and falling water column drives air into and out of the top of the shaft, powering an air-driven turbine.
- **Wave Surge or Focusing Devices.** These shoreline devices, also called "tapered channel" or "tapchan" systems, rely on a shore-mounted structure to channel and concentrate the waves, driving them into an elevated reservoir. Water flow out of this reservoir is used to generate electricity, using standard hydropower technologies.

In December 2007, PG&E signed a power purchase agreement with Finavera Renewables, which had planned to operate a wave farm approximately 2.5 miles off the coast of Eureka, California. The agreement was for 2 MW of power beginning in 2012. On October 16, 2008, the California Public Utilities Commission rejected PG&E's request for approval of a renewable resource procurement contract with Finavera Renewables because, among other reasons, the CPUC concluded the project had not been shown to be viable. As stated in the decision, there is significant uncertainty surrounding wave technology and the wave energy industry is at a beginning stage (CPUC 2008). The

CPUC did authorize up to $4.8 million for PG&E to undertake its WaveConnect project in D.09-01-036. WaveConnect is designed to document the feasibility of a facility that converts wave energy into electricity by using wave energy conversion (WEC) devices in the open ocean adjacent to PG&E's service territory.

In January 2010, the California State Lands Commission and the Federal Energy Regulatory Commission issued a Request for Statements of Interest to prepare an environmental document for the PG&E WaveConnect project discussed above. PG&E has selected a wave energy project siting area that is between 2.5 and 3.0 nautical miles (nm) from the shore in Humboldt County. WaveConnect consists of: (1) wave energy converters (WECs) including multi-point catenary moorings and anchors; (2) marker buoys, navigation lights, and environmental monitoring instruments; (3) subsea electrical cables extending on-shore to (4) land-based power conditioning equipment; (5) an above-ground transmission line and interconnection to the electrical grid; (6) data acquisition and telemetry equipment; and (7) security and safety equipment.

Environmental Assessment. The environmental impacts of wave power have yet to be fully analyzed. A recent study published by the U.S. Department of Commerce and National Oceanic and Atmospheric Administration listed a number of potentially significant environmental impacts created by wave power (Boehlert 2008). These include (Boehlert 2008):

- Significant reduction to waves with possible effects to beaches (e.g., changes to sediment transport processes).
- The use of buoys may have positive effects on forage fish species, which in turn could attract larger predators. Structures need to reduce potential entanglement of larger predators, especially marine turtle species.
- Modifications to water circulation and currents may result in changes to larval distribution and sediment transport.
- Wave energy development may affect community structures for fish and fisheries.
- Lighting and above-water structures may result in marine bird attraction and collisions and may alter food webs and beach processes.
- A diversity of concerns would arise regarding marine mammals including entanglement issues.
- Energy-absorbing structures may affect numerous receptors and should avoid sensitive habitats.
- Chemicals used in the process must be addressed both for spills and for a continuous release such as in fouling paints.
- New hard structures and lighting may break loose and increase debris accumulation.
- Impacts on fish and marine mammals caused by noise coming from the buoys should be understood and mitigated.
- Electromagnetic effects may affect feeding or orientation and should be better understood.

- Impact thresholds need to be established. As projects scale up in location or implementation, new risks may become evident.

Rationale for Elimination

Wave energy is new and may not be technologically feasible; as stated above, PG&E is proposing to sponsor a project to test the feasibility of harnessing wave energy. Additionally, wave power must be located where waves are consistently strong; even then, the production of power depends on the size of waves, which result in large differences in the amount of energy produced. Wave technology is not considered an alternative to the PSPP because is an unproven technology at the scale that would be required to replace the proposed project and because it may also result in substantial adverse environmental impacts. Therefore, this technology is not analyzed in detail in this RSA as an alternative to the PSPP.

B.2.8.4 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 PSPP: to construct and operate an environmentally friendly, economically sound, and operationally reliable solar power generation facility that would contribute approximately 1,000,000 megawatt hours (MWh) of clean, renewable solar energy per year to the State of California's renewable energy goals.

While these generation technologies would not achieve this key objective, they are presented here in brief for the benefit of the public and decision makers. Conservation and demand-side management is also briefly addressed in this section.

The following topics are considered in this analysis:

- natural gas
- coal
- nuclear energy
- conservation and demand-side management

Of the nonrenewable generation alternatives (natural gas, coal, and nuclear), only the natural gas-fired power plants would be viable alternatives within California. However, gas-fired plants would fail to meet a major project objective: to construct and operate a renewable power generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities and would therefore not achieve the purpose and need of the project. Because these alternatives would not support renewable power generation within California, and could have significant environmental impacts of their own, they were eliminated from further consideration.

Natural Gas Generation

Natural gas power generation accounts for approximately 22% of all the energy used in the United States and comprises 40% of the power generated in California (CEC 2007). 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 500 MW would generally require less than 80 acres of land.

Environmental Assessment. 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.
- In order to avoid land use impacts, natural gas-fired power plants must be consistent with local jurisdictions' zoning.
- Several hazardous materials, including regulated substances (aqueous ammonia, hydrogen, and sulfuric acid), would be stored at a natural gas power plant during operation. Aqueous ammonia would be stored in amounts above the threshold quantity during the final stages of construction, initial start-up, and operations phase. Transport of hazardous materials during power plant operation includes delivery of aqueous ammonia and removal of wastes. During operation, the aqueous ammonia transporter would be required to obtain a Hazardous Material Transportation License in accordance with California Vehicle Code section 32105 and would be required to follow appropriate safety procedures and routes.
- Cultural impacts can be severe depending on the power plant siting; however, because natural gas power plants require significantly fewer acres per megawatt of power generated, impacts to cultural resources would be expected to be fewer than with solar facilities.
- 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.

Rationale for Elimination

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. Therefore, this alternative is not considered in detail as an alternative to the PSPP.

Coal Generation

Coal-fired electric generating plants are the cornerstone of America's central power system. Traditional coal-fired plants generate large amounts of greenhouse gases. New "clean

coal technology" includes a variety of energy processes that reduce air emission and other pollutants from coal-burning power plants. The Clean Coal Power Initiative is providing government co-financing for new coal technologies that help utilities meet the Clear Skies Initiative to cut sulfur, nitrogen, and mercury pollutants by nearly 70% by 2018. The Clean Coal Power Initiative is now focusing on developing projects that utilize carbon sequestration technologies and/or beneficial reuse of carbon dioxide (DOE 2008). However, these technologies are not yet in use.

In 2006, approximately 15.7% of the energy used in California came from coal fired sources; 38% of this was generated in state, and 62% was imported (CEC 2007). The in-state coal-fired generation includes electricity generated from out-of-state, coal-fired power plants owned by and reported by California utilities (CEC 2007). In 2006, California enacted SB 1368 (Perata, Chapter 598, Statutes of 2006), which prohibits utilities from making long-term commitments for electricity generated from plants that create more carbon dioxide (CO_2) than clean-burning natural gas plants (CEC 2007).

Environmental Assessment. Coal-fired power plants may also result in numerous environmental impacts such as the following.

- Overall, air quality impacts would increase because coal-fired power plants contribute carbon dioxide, sulfur dioxide, nitrogen oxides, mercury, and fly ash (USEPA 2008a). Mining, cleaning, and transporting coal to the power plants generates additional emissions. Average emissions of a coal-fired power plant are 2,249 pounds per megawatt hour of carbon dioxide, 13 pounds per megawatt hour of sulfur dioxide and 6 pounds per megawatt hour of nitrogen oxides (EPA 2008a). Net increases in greenhouse gas emissions due to coal-firing in the conventional power plants would be significant.
- Health risks associated with power plants have also been documented, including problems associated with exposure to fine particle pollution or soot, an increase in asthma, and an increase in non-fatal heart attacks.
- Large quantities of water are generally required to produce steam and for cooling. When coal-fired power plants use water from a lake or river, fish or other aquatic life can be impacted (EPA 2008).

Rationale for Elimination

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. Therefore, coal generation was eliminated from detailed analysis.

Nuclear Energy

Due to environmental and safety concerns, California law currently prohibits the construction of any new nuclear power plants in California until the California 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). In June 1976, California enacted legislation directing the Energy Commission to perform an independent investigation of the nuclear fuel cycle. This

investigation was to assess whether the technology to reprocess nuclear fuel rods or to dispose of permanently high-level nuclear waste had been demonstrated and approved and was operational (Public Resources Code 25524.1 (a) (1), 25524.1 (b), and 25524.2 (a)). After extensive public hearings, the Energy Commission determined that it could not make the requisite affirmative findings concerning either reprocessing of nuclear fuel or disposal of high-level waste. This information was published in a report: *Status of Nuclear Fuel Reprocessing, Spent Fuel Storage and High-level Waste Disposal*, Energy Commission publication P102-78-001, January 1978.) As a result, the development of new nuclear energy facilities in California was prohibited by law.

It has been more than 25 years since the last comprehensive Energy Commission assessment of nuclear power issues. The *Nuclear Power in California: 2007 Status Report* was published in October of 2007, and gives a detailed description of the current nuclear waste issues and their implications for California. This was prepared as part of the development of the Energy Commission's *2007 Integrated Energy Policy Report* (CEC 2007a).

Rationale for Elimination

New nuclear facilities may not currently be permitted in California, so this technology is infeasible.

Conservation and Demand-Side Management

Conservation and demand-side management consist 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. In 2005 the Energy Commission and CPUC's Energy Action Plan II declared cost effective energy efficiency as the resource of first choice for meeting California's energy needs. The Energy Commission noted that energy efficiency helped flatten the state's per capita electricity use and saved consumers more than $56 billion since 1978 (CPUC 2008). The investor-owned utilities' 2006-2008 efficiency portfolio marks the single-largest energy efficiency campaign in U.S. history, with a $2 billion investment by California's energy ratepayers (CPUC 2008). However, with population growth, increasing demand for energy, and the need to reduce greenhouse gases, there is a greater need for energy efficiency.

The CPUC, with support from the Governor's Office, the Energy Commission, and the California Air Resources Board, among others, adopted the California Long-Term Energy Efficiency Strategy Plan for 2009 to 2020 in September 2008 (CPUC 2008). The plan is a framework for all sectors in California including industry, agriculture, large and small businesses, and households. Major goals of the plan include:

- All new residential construction will be zero net energy by 2020;
- All new commercial construction will be zero net energy by 2030;
- Heating, ventilation, and air conditioning industries will be re-shaped to deliver maximum performance systems;
- Eligible low-income customers will be able to participate in the Low Income Energy Efficiency program and will be provided with cost-effective energy efficiency measures in their residences by 2020.

Rationale for Elimination

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, as stated in the California Energy Commission *2009 Integrated Energy Policy Report*, California's renewable energy goals are based on a percentage of retail sales of electricity, and reducing overall electricity demands means fewer retail sales and therefore less renewable energy that must be generated. Furthermore, it states that conservation and demand-side management means fewer renewable plants will need to be built. However, conservation and demand-side management will not itself provide the renewable energy required to meet the California renewable energy goals.

B.2.9 RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received comments on the Alternatives section of the Staff Assessment (SA) for the proposed Blythe Solar Power Plant (BSPP) from two commenters: the Defenders of Wildlife (DW 2010a) and from the Applicant (Galati & Blek 2010i). Following is a summary of these comments and staff's response to each.

Defenders of Wildlife

Comment 1: The Reduced Acreage Alternative would reduce considerably the impacts to MFTL and its habitats, Dry Wash Woodland, and for wildlife movement north and south of Interstate 10 utilizing existing drainage crossing.

Response: Comment is acknowledged.

Comment 2: In the comment letter dated April 21, 2010 Defenders of Wildlife stated that they had suggested an alternative during scoping that would result in an approximately 250 MW project that would exclude the eastern one-half of the proposed project due to biological resources and habitat concerns. The Defenders of Wildlife continues to believe this is a superior alternative to the proposed project and to the Reduced Acreage Alternative.

Response: The commenter's support for a 250 MW solar facility is acknowledged. A Reduced Acreage Alternative is described in Section B.2 (Alternatives) and was fully analyzed in each discipline's analysis in SA/Draft EIS Section C. The Reduced Acreage Alternative includes half of the exclusion area suggested by the commenter; it would eliminate approximately one-half of the 250 MW eastern solar field (Unit 1). However, this alternative would allow development of the other portion of the solar field. The whole eastern solar field was not incorporated into the Reduced Acreage Alternative because the alternative had been designed to avoid the large central desert wash and the majority of the Mojave Fringe-toed lizard habitat which was achieved by eliminating a portion of the eastern unit.

CEQA requires consideration of a reasonable range of alternatives that meet the CEQA screening criteria (see CEQA Guidelines Section 15126 (a)). CEQA does not require full analysis of all potential alternatives to a proposed project. The RSA includes a

comprehensive alternatives analysis, including full consideration of six alternatives (the Reconfigured Alternative, Reduced Acreage Alternative, North of Desert Center Alternative, and No Project Alternative, in addition to Reconfigured Alternative #2 and Reconfigured Alternative #3 which were included in the RSA and would avoid the majority of the dune habitat on the eastern portion of the project) and discussion of an additional 18 alternatives that were considered but eliminated from detailed consideration.

Comment 3: Defenders of Wildlife supports any private land alternative that would involve use of previously disturbed areas where native vegetation no longer exists. As such, the North of Desert Center Alternative appears superior to the proposed project site.

Response: Comment is acknowledged. The analysis in this section acknowledges that this alternative would reduce impacts to biological resources.

Applicant

Comment 1: The Applicant stated that Staff should include an objective with the following points for the project:

- State and federal governments are clustering renewable energy development with the goals of minimizing environmental impact, maximizing renewable energy production, minimizing sprawl, and reducing infrastructure investment.
- PSPP is located in an area identified as a priority area for renewable energy development by RETI and the Solar Energy Study Areas.
- The DRECP is also focusing on gathering data and mapping biological areas and wildlife movement corridors.
- Co-locating multiple solar thermal power plants minimizes disturbance across the region and allows an economy of scale that allows the design to utilize shared/common facilities for multiple power plants. Co-located facilities also consolidate the impacts of lighting, noise, and human presence at a single location rather than introducing them in multiple environments.

Response: After considering the objectives set forth by the Applicant in the PSPP AFC, the Energy Commission identified two objectives related to siting of the proposed project as well as four objectives regarding California's RPS and Global Warming Solutions Act. These six basic project objectives identified by the Energy Commission were then used to shape the alternatives analysis in accordance with CEQA requirements (see Section B.2.4.2).

The information provided by the applicant regarding renewable energy clusters or zones is helpful to the public because it provides background regarding the current State and federal planning for renewable energy. However, the Energy Commission's project objectives already incorporate reference to the California's RPS and Global Warming Solutions Act. The planning documents sited above, while helpful background, also acknowledge the complexities in siting renewable energy development and the need for careful placement of renewable projects to avoid sensitive environmental resources. For example, the RETI Draft Phase 2B report highlights the refinements RETI made to the Competitive Renewable Energy Zones (CREZ) previously published to avoid sensitive

resources within CREZs. Likewise, the DRECP Starting Point Maps (March, 2010) acknowledge that sensitive resources occur within renewable clusters and locate conservation opportunities immediately adjacent to Renewable Energy Study Areas. As shown in Section C of the SA, sensitive resources are not evenly distributed throughout the PSPP site and it is not necessarily true that clustering renewable resources would result in the most environmentally benign solution in every case.

Comment 2: Applicant highlights the bullet point in Section B.2.4.3 regarding cumulative impacts and requests that Staff address the benefit of co-locating two solar thermal units by avoiding further fragmentation to native plant communities and wildlife habitat.

Response: Section B.2.4.3 simply summarized the conclusion presented in Section C of the SA and is not based on analysis presented in the Alternatives section. Please refer to Section C.2 for current status and clarification.

See also Response to Applicant Comment 1 regarding the complexities of renewable energy siting and the benefits and drawbacks to co-locating renewable projects as highlighted by the State planning documents.

Comment 3: Applicant highlights the bullet point in Section B.2.4.3 regarding soil and water resources and states that Staff could complete its analysis of Soil and Water Resources without a finding by the U.S. Army Corps of Engineers of whether the ephemeral drainages on the Project site are jurisdictional waters of the U.S. Applicant believes Staff can require a condition of certification requiring PVSI to obtain a 404 permit or provide proof that a permit is not required.

Response: Reference to the U.S. Army Corps of Engineers jurisdiction has been deleted. Please refer to Section C.9 for current status and clarification regarding this issue.

Comment 4: SA/DEIS refers to BSPP and Blythe Mesa Alternative instead of PSPP and North of Desert Center Alternative.

Response: References to BSPP and Blythe Mesa Alternative have been deleted.

Comment 5: Regarding Section B.2.8.2 (Distributed Solar Technology) the applicant clarifies that the Andasol 1 power plant generates 50 MW on 500 acres, of which 127 acres is the mirror area. Andasol 1 is one of three 50 MW solar thermal power plants developed by Solar Millennium Group and is not considered by Solar Millennium as distributed generation technology.

Response: The comment is acknowledged. As stated in Section B.2.8.2 (Distributed Solar Technology) there is no single accepted definition of distributed solar technology. The 2009 IEPR defines distributed generation resources based on their connection to the transmission and distribution grid and whether they are located at or near the location where the energy is used. References to Andasol 1 have been removed from Section B.2.8.2 (Distributed Solar Technology). However, Solar Millennium literature states that their technology can be used for applications such as desalination plants and industrial facilities that require energy at point source and that Solar Millennium has

ventures as small as 20 MW [MAN Solar Millennium GmbH] (Solar Millennium, 2008). As such, it would appear that Solar Millennium's technology is appropriate for use as distributed solar technology.

Comment 6: The Applicant states that Distributed Technology would not meet the Applicant's objectives which are the "controlling objectives". The Applicant states that PSI could not deliver 500 MW of competitive renewable energy to a utility through a distributed system because it would require coordination with thousands of owners and a complex system of transmission.

Response: Comment noted. While staff understands that the Applicant may not be interested in pursuing distributed technology, CEQA requires an analysis of a broad range of project alternatives, even though some alternatives may not meet all of the identified project objectives. The range of *potential* alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project…" "even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly." (CEQA Guidelines § 15126.6(b) & (c).)

Section B.2.8.2 (Distributed Solar Technology) includes a lengthy discussion regarding distributed generation technologies and excludes it from more detailed review.

B.2.10 CONCLUSIONS OF ALTERNATIVES ANALYSIS

In this analysis of the Palen Solar Power Project, 24 alternatives to the project have been developed and evaluated. These include five alternative site locations or configurations, a range of different solar and renewable technologies, generation technologies using different fuels, and conservation/demand-side management. Of the 24 alternatives, five alternatives were determined to be potentially feasible by the Energy Commission and appeared to have the potential to substantially reduce one or more of the project's significant impacts. These alternatives are: the Reconfigured Alternative, Reconfigured Alternative #2, Reconfigured Alternative #3, and the Reduced Acreage Alternative. In addition to the proposed action and the potentially feasible alternatives, staff considered the No Project Alternative.

Each of the three reconfigured alternatives is a different 500 MW project, but the alternatives arrange the solar troughs in different ways to avoid different portions of the valuable sand transport corridor. The impacts of these three alternatives are analyzed in each discipline's analysis in Sections C and D.

The Reconfigured Alternative was defined December, 2009 by Palen Solar I, LLC (the Applicant) in response to a staff data request. It would have the same generation capacity as the 500 MW proposed project, and was found to have impacts similar to the proposed project for most resource elements. Due to its modified shape and avoidance of desert washes, the Reconfigured Alternative would eliminate the proposed project's significant unmitigable impacts to a wildlife movement corridor. However, the Reconfigured Alternative would not avoid the significant impacts to the sand transport corridor, sand dune habitat, and Mojave fringe-toed lizard. Significant impacts to land use would also remain with the Reconfigured Alternative, and the significant visual impacts of the proposed project would increase slightly with this alternative.

Reconfigured Alternative #2 was defined in June 2010 by the Applicant in response to staff concerns that the first Reconfigured Alternative would not eliminate significant impacts to the Mojave fringe-toed lizard, sand dune habitat and sand transport corridor. The Reconfigured Alternative #2 would generate 500 MW like the proposed project, and was found to have impacts similar to the proposed project for most resource elements. Significant impacts to land use would remain with the Reconfigured Alternative #2, and the significant visual impacts of the proposed project would increase slightly with this alternative due to its greater proximity to the Interstate 10. Due to its modified shape, the Reconfigured Alternative #2 appears to reduce impacts to Mojave fringe toed lizards, sand dune habitat, and the sand transport corridor. However, the conclusions of the biological analysis are necessary to confirm the extent to which these impacts are reduced. Reconfigured Alternative #2 appears to be a feasible alternative and at this time appears to be preferred to the proposed project.

Reconfigured Alternative #3 was also defined in June 2010 by the Applicant also in response to concerns regarding the Mojave fringe-toed lizard, sand dune habitat and sand transport corridor. It would be similar to the Reconfigured Alternative #2 but would not require use of private land not currently controlled by the Applicant. It would have the same generation capacity as the proposed project and was found to have impacts similar to the proposed project for most resource elements. Significant impacts to land use would remain with the Reconfigured Alternative #3, and the significant visual impacts of the proposed project would increase slightly with this alternative. Due to its modified shape, the Reconfigured Alternative #3 also appears to reduce impacts to Mojave fringe toed lizards, sand dune habitat, and the sand transport corridor. However, the conclusions of the biological analysis are necessary to confirm the extent to which these impacts are reduced. Reconfigured Alternative #3 appears to be a feasible alternative and at this time appears to be preferred to the proposed project.

The Reduced Acreage Alternative would generate 375 MW (75% as large as the proposed project). Staff developed this alternative to eliminate the two portions of the Reconfigured Alternative that created significant and unmitigable impacts: the sand transport corridor in the northern and northeastern portions of the right-of-way area and the Critical Habitat for desert tortoise in the southwestern corner of the right-of-way area. This alternative also adds solar field areas in an attempt to minimize the loss of generating capacity. The Reduced Acreage Alternative was found to reduce many of the impacts of the proposed PSPP. It would eliminate the unmitigable significant impacts to the sand transport corridor, to the Mojave fringe-toed lizard, and to the primary desert dry wash wildlife corridor. It would result in approximately 299 acres of direct impacts to dunes within sand transport corridor and 292 acres of indirect impacts to the sand transport corridor (sand shadow). With staff's proposed Conditions of Certification, the Reduced Acreage Alternative would result in impacts to all other biological resources being less than significant. However, the Reduced Acreage Alternative would slightly increase the significant visual impacts as compared with the proposed project. The Reduced Acreage Alternative is considered to be potentially feasible, as solar thermal facilities of 375 MW and smaller are currently proposed in California. However, no studies have been done to evaluate its economic feasibility.

CEC staff has determined that the No Project Alternative is not superior to the proposed project because it would likely delay development of renewable resources or shift renewable development to other similar areas, and could lead to increased operation of existing power plants that use non-renewable technologies.

The Desert Center Alternative would be located on private land and would have impacts similar to those of the proposed site in many resource elements. However, because this alternative would be on disturbed agricultural lands, it is likely to have less severe biological resources and cultural resources impacts. The Desert Center Alternative is made up of approximately 151 parcels with 40 separate landowners. The alternative is potentially feasible; however, due to the number of parcels that would have to be acquired obtaining site control would be more challenging at this site than at the proposed site, where the BLM is the only land management entity.

Alternative solar thermal technologies (Stirling engine, solar power tower, utility scale solar photovoltaics, and linear Fresnel) that could be used at the proposed site are also evaluated. As compared with the proposed solar trough technology, most of these technologies would not substantially reduce one or more of the project's significant impacts including to visual resources, biological resources and cultural resources, as all require extensive acreage. Water use varies among the technologies.

Distributed solar photovoltaic facilities would likewise require extensive acreage, although it can also be installed on existing buildings and closer to urban areas, minimizing the loss of undisturbed open space and the need for transmission lines. However, increased deployment of distributed solar photovoltaics faces challenges in manufacturing capacity, cost, and policy implementation.

Other generation technologies (wind, geothermal, biomass, tidal, wave, natural gas, and nuclear) are also examined as possible alternatives to the project. These technologies would either be potentially infeasible at the scale of the PSPP, or would not substantially reduce one or more of the project's significant impacts without creating their own significant impacts in other locations. A natural gas plant would contribute to greenhouse gas emissions and would not meet the project's renewable generation objective. Construction of new nuclear power plants is currently prohibited under California law. Wave and tidal technologies are not yet commercially available in the United States.

Conservation and demand side management programs would likely not meet the state's growing electricity needs that would be served by the Palen Solar Power Project. In addition, these programs would not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements.

Staff's analysis of renewable energy technology options indicates that contributions from each commercially available renewable technology will be needed to meet California's Renewable Portfolio Standard requirements and to achieve the statewide RPS target for 2020 (between 45,000 GWhs to almost 75,000 GWhs according to the 2009 IEPR). Therefore, the combined contribution of the alternatives of wind, distributed

solar photovoltaic, geothermal, and biomass is needed to complement rather than substitute for the Palen Solar Power Project solar thermal contribution to meeting SCE and statewide RPS requirements.

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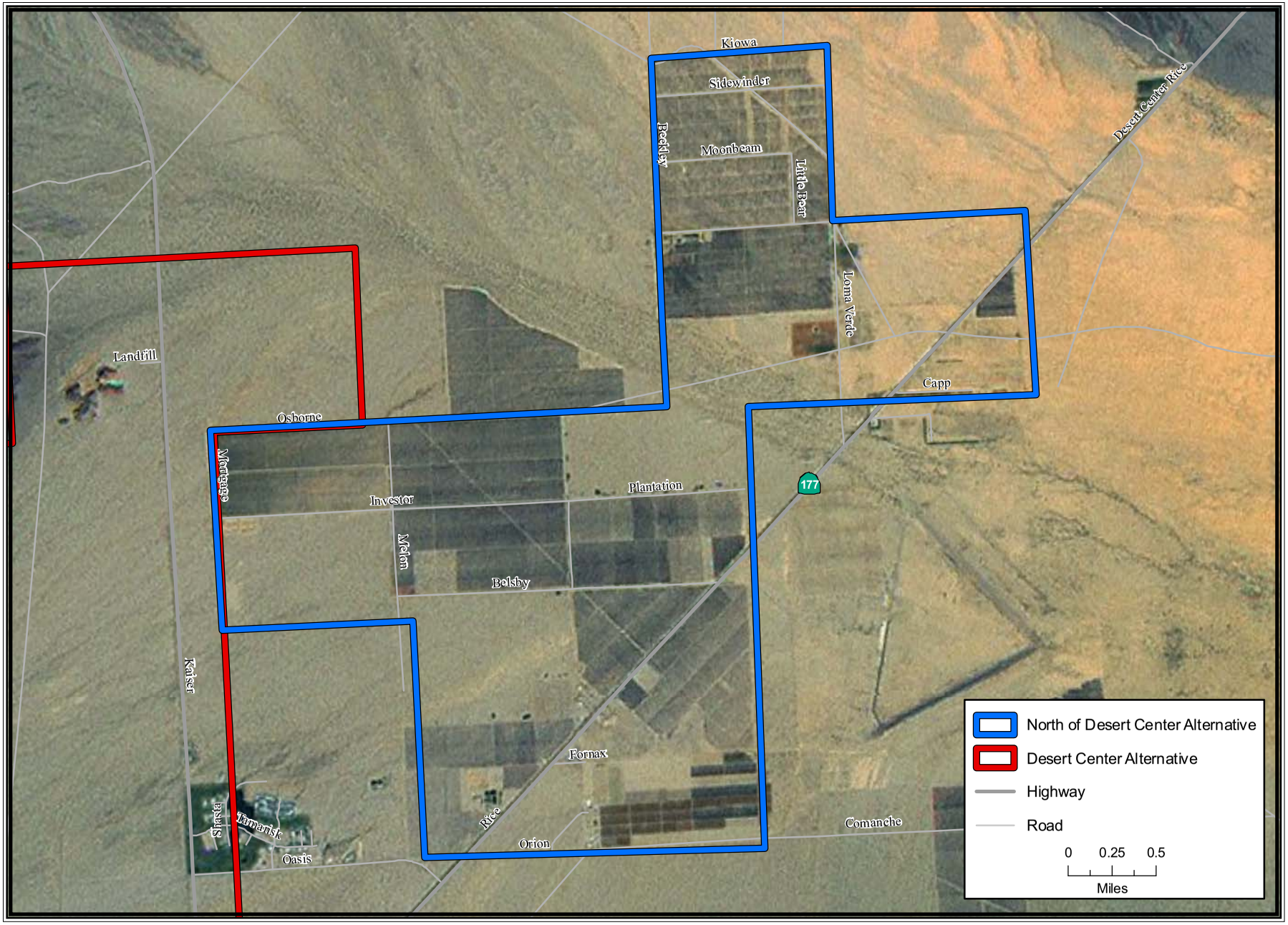
ALTERNATIVES - FIGURE 1

Palen Solar Power Plant - North of Desert Center Alternative

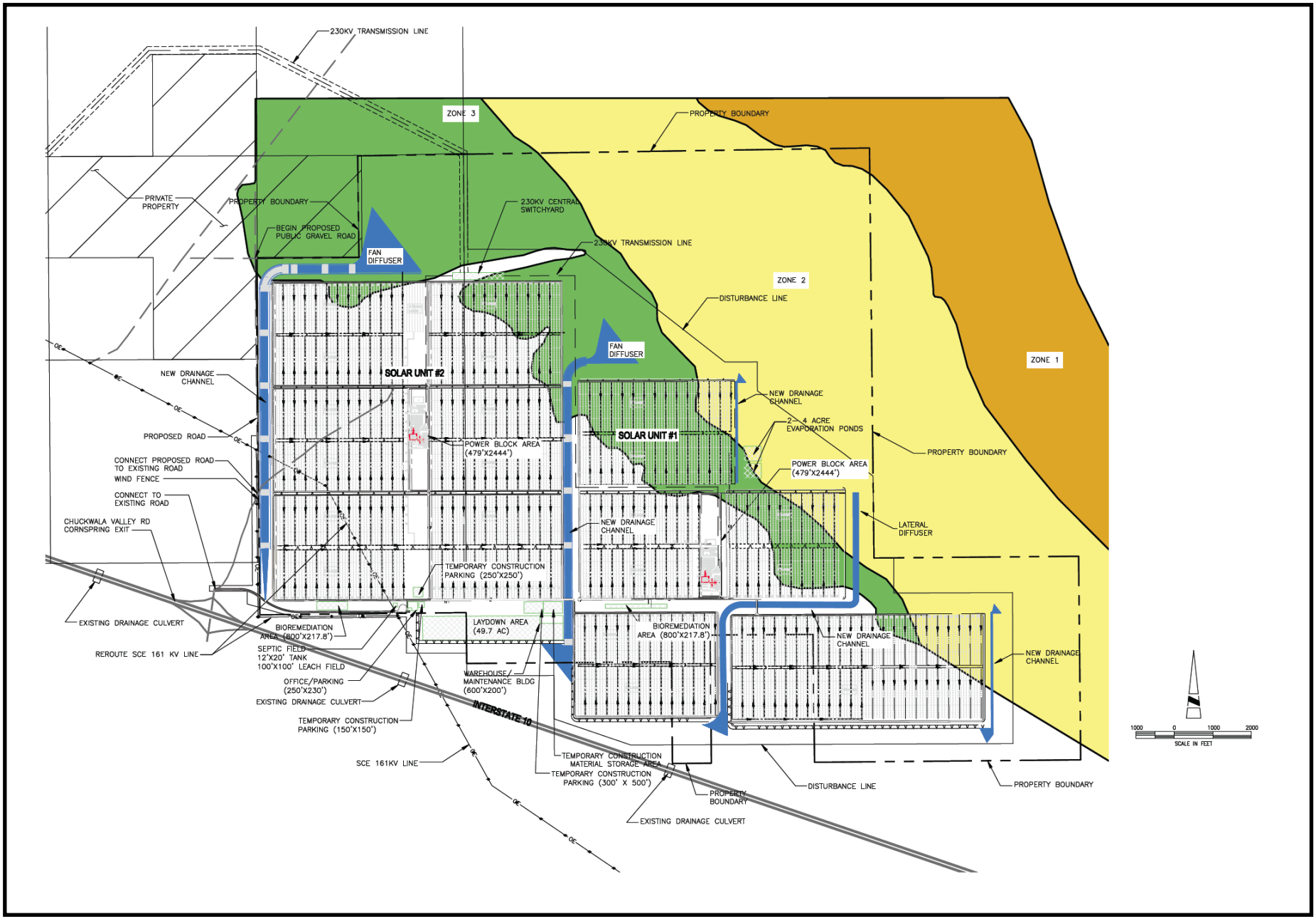


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission

ALTERNATIVES - FIGURE 1B

Palen Solar Power Project - Reconfigured Alternative #2



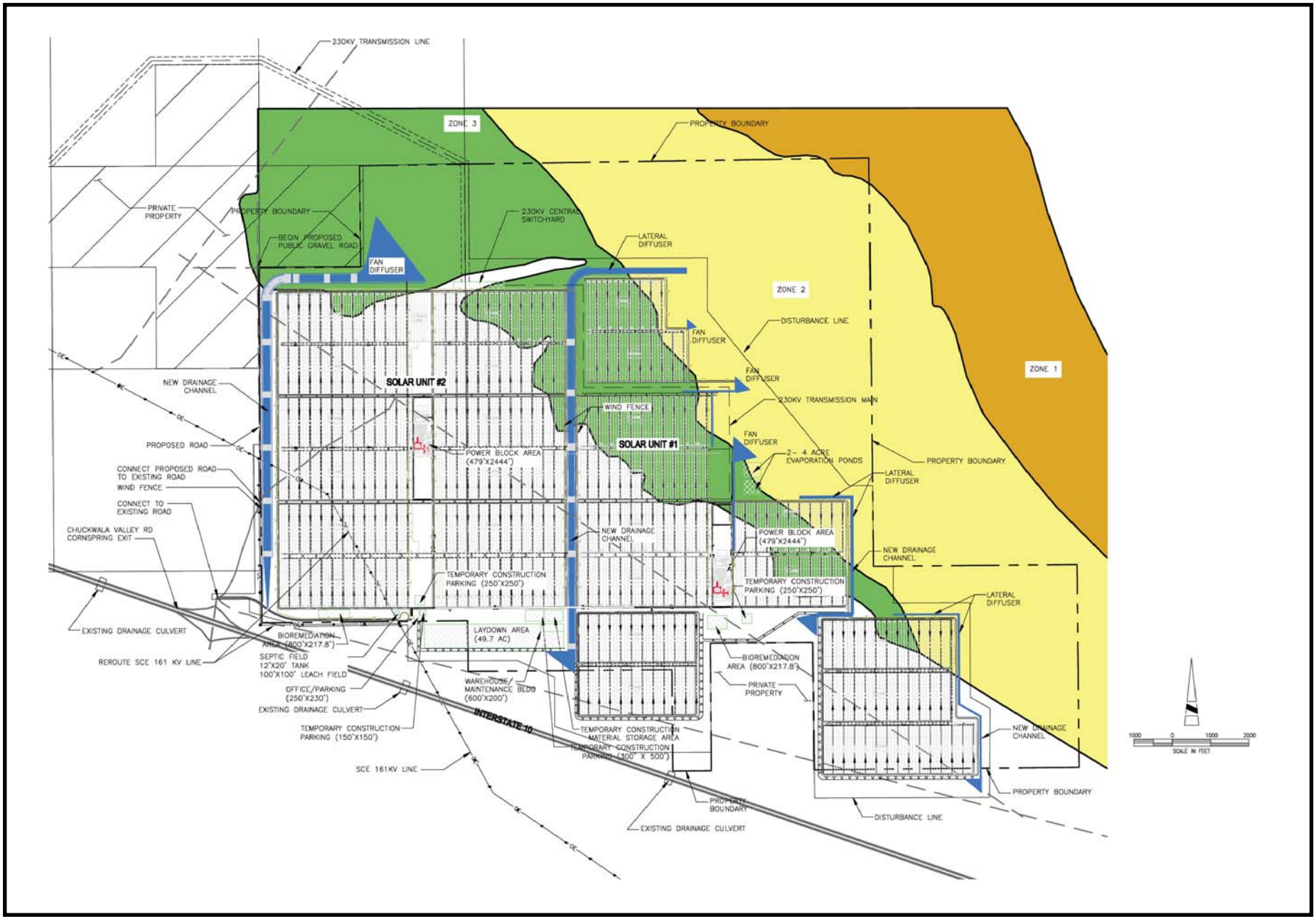
ALTERNATIVES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Solar Millennium 2010

ALTERNATIVES - FIGURE 1C

Palen Solar Power Project - Reconfigured Alternative #3



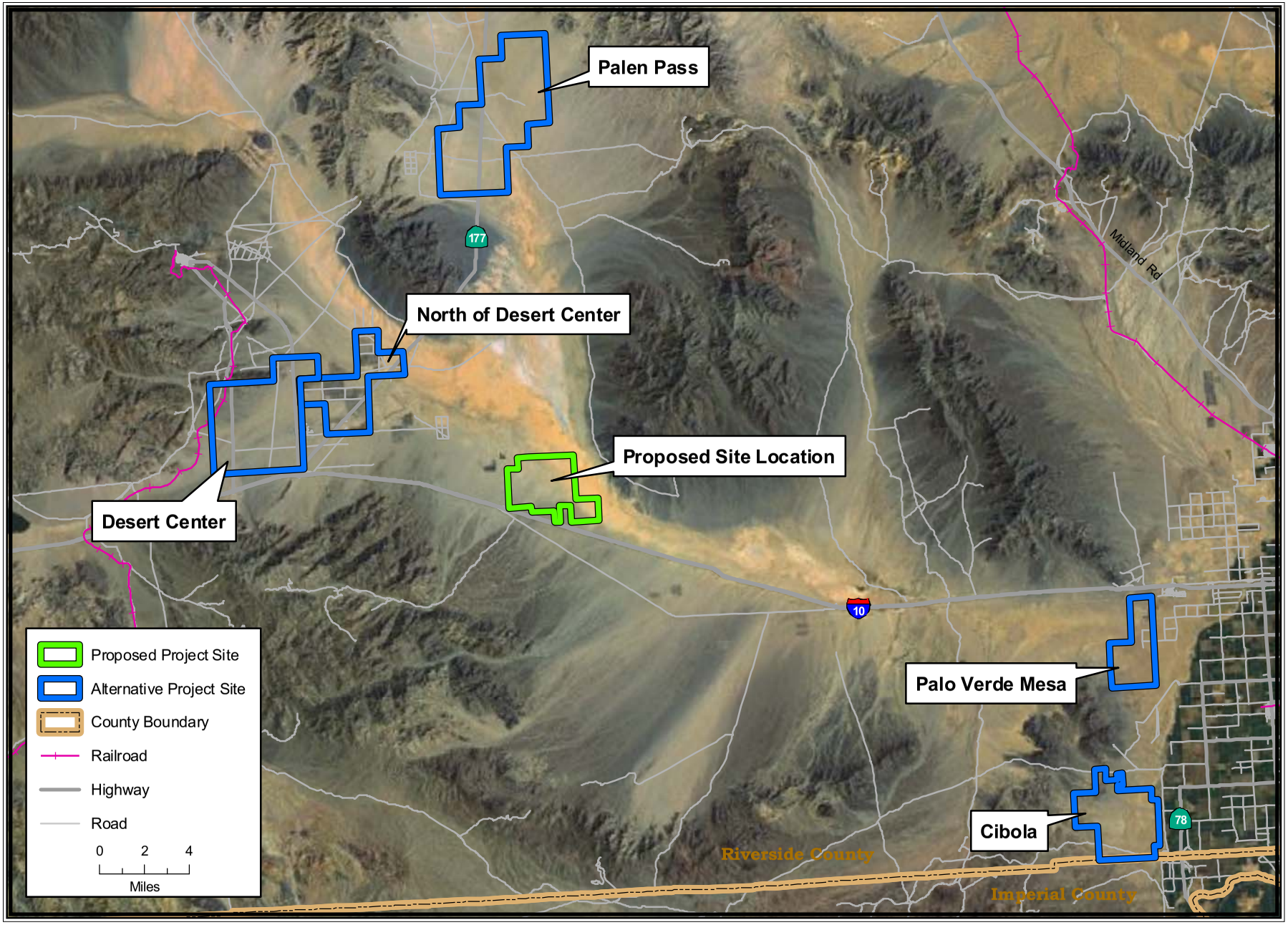
ALTERNATIVES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Solar Millennium 2010

ALTERNATIVES - FIGURE 2

Palen Solar Power Plant - Alternatives Sites



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission

ALTERNATIVES - FIGURE 3

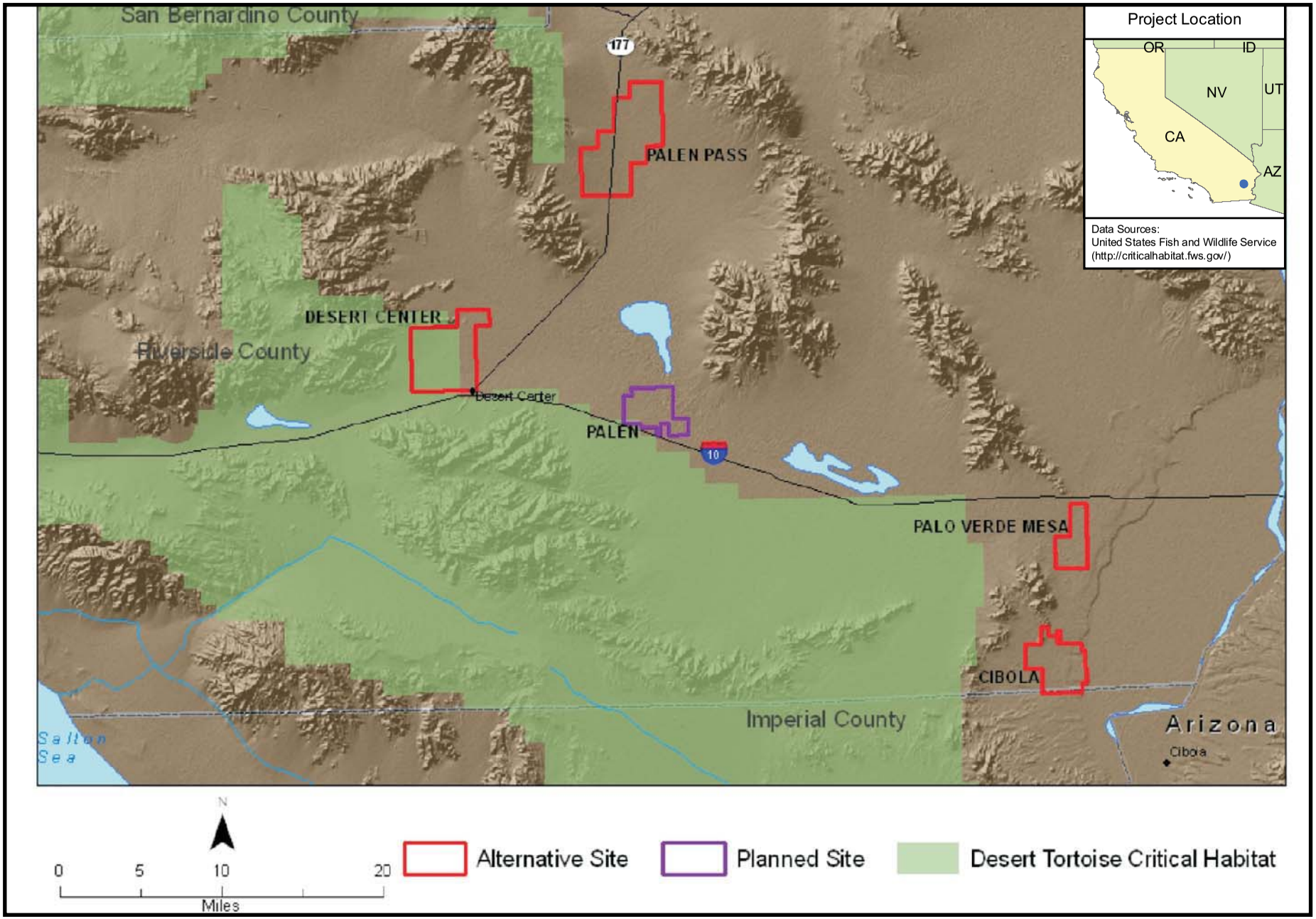
Palen Solar Power Project - North of Desert Center Alternative

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission

ALTERNATIVES - FIGURE 4

Palen Solar Power Project - Alternatives Considered but not Evalutated in Further Detail

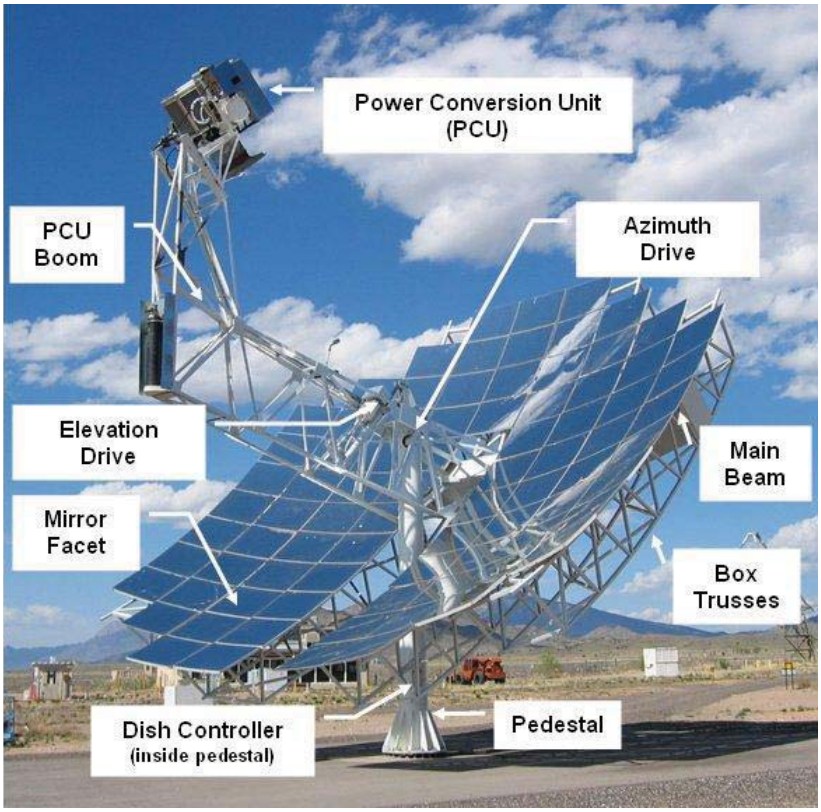


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Solar Millennium 2009a

ALTERNATIVES - FIGURE 5

Palen Solar Power Project - Solar Generation Technologies



Stirling dish (from Stirling Energy Systems website)

Solar Power Tower (from ISEGS PSA, 2008)

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: As noted

ALTERNATIVES- FIGURE 6

Palen Solar Power Project - Linear Fresnel and Photovoltaic Technologies

Linear Fresnel technology
(Wikipedia.org, Fresnel_reflectors_ausra.jpg)

First Solar's thin film solar photovoltaic field
(Photo: Susan Lee)

Canon Solar Partners proposes to use the 35 kW Amonix system
(Canon 2008)

SunPower's PowerTracker Solar in Gwangju City Power Plant, South Korea - 1 MW
http://www.sunpowercorp.com/For-Power-Plants.aspx

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: As noted

B.3 – CUMULATIVE SCENARIO

Testimony of Susan V. Lee

B.3.1 INTRODUCTION

Preparation of a cumulative impact analysis is required under CEQA. Under CEQA Guidelines, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts" (14 Cal Code Regs §15130(a)(1)). 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)). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

CEQA also states that both the severity of impacts and the likelihood of their occurrence are to be reflected in the discussion, "but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion of cumulative impacts shall be guided by standards of practicality and reasonableness, and shall focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact" (14 Cal Code Regs §15130(b)).

B.3.2 RENEWABLE RESOURCES IN CALIFORNIA

A large number of renewable projects have been proposed on BLM managed land, State land, and private land in California. As of January 2010, there were 244 renewable projects proposed in California in various stages of the environmental review process or under construction. As of December 2009, *49* of these projects, representing approximately 10,500 MW, were planning on requesting American Recovery and Reinvestment Act funds from the Federal government. Solar, wind, and geothermal development applications have requested use of BLM land, including approximately 1 million acres of the California desert. State and private lands have also been targeted for renewable solar and wind projects.

Cumulative Figures 1 and **Cumulative Tables 1A and 1B** illustrate the numerous proposed renewable projects on BLM, State and private land in California. In addition, nearly 80 applications for solar and wind projects are being considered on BLM land in Nevada and Arizona.

Likelihood of Development. The large renewable projects now described in applications to the BLM and on private land are competing for utility Power Purchase Agreements, which will allow utilities to meet state-required Renewable Portfolio Standards. Not all of the projects listed in **Tables 1A** and **1B** will complete the environmental review, and not all projects will be funded and constructed. It is unlikely that all of these projects will be constructed for the following reasons:

- Not all developers will develop the detailed information necessary to meet BLM and Energy Commission standards. Most of the solar projects with pending applications are proposing generation technologies that have not been implemented at large scales. As a result, preparing complete and detailed plans of development (PODs) is difficult, and completing the required NEPA and CEQA documents is especially time-consuming and costly.
- As part of approval by the appropriate Lead Agency under CEQA and/or NEPA (generally the Energy Commission and/or BLM), all regulatory permits must be obtained by the applicant or the prescriptions required by the regulatory authorities incorporated into the Lead Agency's license, permit or right-of-way grant. The large size of these projects may result in permitting challenges related to endangered species, mitigation measures or requirements, and other issues.
- Also after project approval, construction financing must be obtained (if it has not been obtained earlier in the process). The availability of financing will be dependent on the status of competing projects, the laws and regulations related to renewable project investment, and the time required for obtaining permits.

Incentives for Renewable Development. A number of existing policies and incentives encourage renewable energy development. These incentives lead to a greater number of renewable energy proposals. Examples of incentives for developers to propose renewable energy projects on private and public lands in California, Nevada and Arizona, include the following:

- **U.S. Treasury Department's Payments for Specified Energy Property in Lieu of Tax Credits** under §1603 of the American Recovery and Reinvestment Act of 2009 (Public Law 111-5) - Offers a grant (in lieu of investment tax credit) to receive funding for 30% of their total capital cost at such time as a project achieves commercial operation (currently applies to projects that begin construction by December 31, 2010 and begin commercial operation before January 1, 2017).
- **U.S. Department of Energy (DOE) Loan Guarantee Program** pursuant to §1703 of Title XVII of the Energy Policy Act of 2005 - Offers a loan guarantee that is also a low interest loan to finance up to 80% of the capital cost at an interest rate much lower than conventional financing. The lower interest rate can reduce the cost of financing and the gross project cost on the order of several hundred million dollars over the life of the project, depending on the capital cost of the project.

B.3.3 DEFINITION OF THE CUMULATIVE PROJECT SCENARIO

Cumulative impacts analysis is intended to highlight past actions that are closely related either in time or location to the project being considered, catalogue past projects and discuss how they have harmed the environment, and discuss past actions even if they were undertaken by another agency or another person. Most of the projects listed in the cumulative projects tables (**Cumulative Tables 1A and 1B, 2, and 3** at the end of this section) have, are, or will be required to undergo their own independent environmental review under CEQA.

Under CEQA, there are two acceptable and commonly used methodologies for establishing the cumulative impact setting or scenario: the "list approach" and the "projections approach". The first approach would use a "list of past, present, and probable future projects producing related or cumulative impacts." 14 Cal Code Regs §15130(b)(1)(A). The second approach is to use a "summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact" (14 Cal Code Regs §15130(b)(1)(B)). This Revised Staff Assessment(RSA) uses the "list approach" for purposes of state law to provide a tangible understanding and context for analyzing the potential cumulative effects of a Project.

In order to provide a basis for cumulative analysis for each discipline, this section provides information on other projects in both maps and tables. The Energy Commission and the BLM have identified the California desert as the largest area within which cumulative effects should be assessed for all disciplines, as shown in two maps and accompanying tables. However, within the desert region, the specific area of cumulative effect varies by resource. For this reason, each discipline has identified the geographic scope for the discipline's analysis of cumulative impacts. **Cumulative Figures 1 and 2** are on the following pages, and **Cumulative Tables 1,2, and 3** are presented at the end of this section.

Cumulative Impacts Figure 2 (I-10 Corridor Existing and Future/Foreseeable Projects) and **Tables 2 and 3** define the projects in the immediate vicinity of the I-10 corridor. The area included on these tables consists of an approximate 15 to 20-mile radius around the project site. Table 2 presents existing projects and Table 3 presents future foreseeable projects. Both tables indicate project name, type, location, and status. This data is presented for consideration within each discipline.

B.3.4 APPROACH TO CUMULATIVE IMPACT ANALYSIS

This RSA evaluates cumulative impacts within the analysis of each resource area, following these steps:

- Define the geographic scope of cumulative impact analysis for each discipline, based on the potential area within which impacts of the Palen Solar Power Project could combine with those of other projects.
- Evaluate the effects of the Palen Solar Power Project in combination with past and present (existing) projects within the area of geographic effect defined for each discipline.
- Evaluate the effects of the Palen Solar Power Project with foreseeable future projects that occur within the area of geographic effect defined for each discipline.

Each of these steps is described below.

B.3.4.1 GEOGRAPHIC SCOPE OF CUMULATIVE ANALYSIS

The area of cumulative effect varies by resource. For example, air quality impacts tend to disperse over a large area, while traffic impacts are typically more localized. For this

reason, the geographic scope for the analysis of cumulative impacts must be identified for each resource area.

The analysis of cumulative effects considers a number of variables including geographic (spatial) limits, time (temporal) limits, and the characteristics of the resource being evaluated. The geographic scope of each analysis is based on the topography surrounding the Palen Solar Power Project and the natural boundaries of the resource affected, rather than jurisdictional boundaries. The geographic scope of cumulative effects will often extend beyond the scope of the direct effects, but not beyond the scope of the direct and indirect effects of the proposed action and alternatives.

In addition, each project in a region will have its own implementation schedule, which may or may not coincide or overlap with the Palen Solar Power Project's schedule. This is a consideration for short-term impacts from the Palen Solar Power Project. However, to be conservative, the cumulative analysis assumes that all projects in the cumulative scenario are built and operating during the operating lifetime of the Palen Solar Power Project.

B.3.4.2 PROJECT EFFECTS IN COMBINATION WITH FORESEEABLE FUTURE PROJECTS

The intensity, or severity, of the cumulative effects should consider the magnitude, geographic extent, duration and frequency of the effects (CEQ, 1997). The magnitude of the effect reflects the relative size or amount of the effect; the geographic extent considers how widespread the effect may be; and the duration and frequency refer to whether the effect is a one-time event, intermittent, or chronic (CEQ, 1997).

Each discipline evaluates the impacts of the proposed project on top of the current baseline; the past, present (existing) and reasonably foreseeable or probable future projects in each I-10 corridor project vicinity as illustrated in **Cumulative Impacts – Figure 2 (I-10 Corridor Existing and Future/Foreseeable Projects)** and **Cumulative Impacts Tables 2 (existing projects) and 3 (future/foreseeable projects)**.

Reasonably foreseeable projects that could contribute to the cumulative effects scenario depend on the extent of resource effects, but could include projects in the immediate I-10 corridor area as well as other large renewable projects in the California, Nevada, and Arizona desert regions. These projects are illustrated in **Cumulative Impacts Figures 1 and 2**. As shown in the map and table, there are a number of projects in the immediate area around the I-10 corridor whose impacts could combine with those of the proposed project. As shown on **Cumulative Impacts Figure 1** and in **Table 1**, solar and wind development applications for use of BLM land have been submitted for approximately 1 million acres of the California Desert Conservation Area. Additional BLM land in Nevada and Arizona also has applications for solar and wind projects.

Cumulative Impacts Table 1A
Renewable Energy Projects in the California Desert District

BLM Field Office	Number of Projects & Acres	Total MW
Solar Energy		
Barstow Field Office	• 18 projects • 132,560 acres	• 12,875 MW
El Centro Field Office	• 7 projects • 50,707 acres	• 3,950 MW
Needles Field Office	• 17 projects • 230,480 acres	• 15,700 MW
Palm Springs Field Office	• 17 projects • 123,592 acres	• 11,873 MW
Ridgecrest Field Office	• 4 projects • 30,543 acres	• 2,835 MW
TOTAL – California Desert District	• **63 projects** • **567,882 acres**	• **47,233 MW**
Wind Energy		
Barstow Field Office	• 25 projects • 171,560 acres	• n/a
El Centro Field Office	• 9 projects (acreage not given for 3 of the projects) • 48,001 acres	• n/a
Needles Field Office	• 8 projects • 115,233 acres	• n/a
Palm Springs Field Office	• 4 projects • 5,851 acres	• n/a
Ridgecrest Field Office	• 16 projects • 123,379 acres	• n/a
TOTAL – California Desert District	• **62 projects** • **433,721 acres**	• n/a

Source: Renewable Energy Projects in the California Desert Conservation Area identifies solar and wind renewable projects as listed on the BLM California Desert District Alternative Energy Website (BLM 2009)

Cumulative Impacts Table 1B

Renewable Energy Projects on State and Private Lands*

Project Name	Location	Status
Solar Projects		
Solargen Panoche Valley Solar Farm (400 MW Solar PV)	San Benito County	EIR in progress
Maricopa Sun Solar Complex (350 MW Solar PV)	Kern County	Information not available
Panoche Ranch Solar Farm (250 MW Solar PV)	Kern County	Information not available
Gray Butte Solar PV (150 MW Solar PV)	Los Angeles County	Information not available
Monte Vista (126 MW Solar PV)	Kern County	Information not available
San Joaquin Solar 1 and 2 (107 MW Solar hybrid)	Fresno	Under environmental review
NRG Alpine Suntower (40 MW solar PV and 46 MW solar thermal)	Los Angeles	Information not available
Palmdale Hybrid Power Project Unit 1 (50 MW solar thermal, part of a hybrid project)	City of Palmdale	Under environmental review
Lucerne Valley Solar (50 MW solar PV)	San Bernardino	Under environmental review
Lost Hills (32.5 solar PV)	Kern County	Information not available
Tehachapi Photovoltaic Project (20 MW solar PV)	Kern County	Information not available
Sun City Project Phase 1 (20 MW solar PV)	Kings County	Information not available
Boulevard Associates (20 MW solar PV)	San Bernardino County	Information not available
Stanislaus Solar Project I (20 MW solar PV)	Stanislaus County	Information not available
Stanislaus Solar Project II (20 MW solar PV)	Stanislaus County	Information not available
Synapse Solar 2 (20 MW solar PV/solar thermal)	Kings County	Information not available
T, squared, Inc. (19 MW solar PV)	Kern County	Information not available
Rancho Seco Solar Thermal (15-17 MW solar trough)	Sacramento County	Information not available
Global Real Estate Investment Partners, LLC (solar PV)	Kern County	Information not available
Recurrent Energy (solar PV)	Kern County	Information not available
Man-Wei Solar (solar PV)	Kern County	Information not available
Regenesis Power for Kern County Airports Dept.	Kern County	Information not available
Abengoa Mojave Solar Project (250 MW solar thermal)	San Bernardino County, Harper Lake	Under environmental review
Rice Solar Energy Project (150 MW solar thermal)	Riverside County, north of Blythe	Under environmental review
3 MW solar PV energy generating facility	San Bernardino County, Newberry Springs	MND published for public review
Blythe Airport Solar 1 Project (100 MW solar PV)	Blythe, California	MND published for public review
First Solar's Blythe (21 MW solar PV)	Blythe, California	Under construction
California Valley Solar Ranch (SunPower) (250 MW solar PV)	Carrizo Valley, San Luis Obispo County	Under environmental review
LADWP and OptiSolar Power Plant (68 MW solar PV)	Imperial County, SR 111	Under environmental review
Topaz Solar Farm (First Solar) (550 MW solar PV)	Carrizo Valley, San Luis Obispo County	Under environmental review
AV Solar Ranch One (230 MW solar PV)	Antelope Valley, Los Angeles County	Under environmental review
Bethel Solar Hybrid Power Plant (49.4 MW hybrid solar thermal and biomass)	Seeley, Imperial County	Under environmental review
Mt. Signal Solar Power Station (49.4 MW hybrid solar thermal and biomass)	8 miles southwest of El Centro, Imperial County	Under environmental review

Project Name	Location	Status
Wind Projects		
Alta-Oak Creek Mojave Project (up to 800 MW)	Kern County, west of Mojave	Under environmental review
PdV Wind Energy Project (up to 300 MW)	Kern County, Tehachapi Mountains	Approved
City of Vernon Wind Energy Project (300 MW)	City of Vernon	Information not available
Manzana Wind Project (246 MW)	Kern County	Information not available
Iberdrola Tule Wind (200 MW)	San Diego County, McCain Valley	EIR/EIS in progress
Padoma Wind Energy (175 MW)	Shasta County	Information not available
Pine Canyon (150 MW)	Kern County	Information not available
Shiloh III (200 MW)	Montezuma Hills, Solano County	Information not available
AES Daggett Ridge (84 MW)	San Bernardino	EIS in progress
Granite Wind, LLC (81 MW)	San Bernardino	EIR/EIS in progress
Bear River Ridge (70 MW)	Humboldt County	Information not available
Aero Tehachapi (65 MW)	Kern County	Information not available
Montezuma Wind II (52-60)	Montezuma Hills, Solano County	Information not available
Tres Vaqueros (42 MW wind repower)	Contra Costa County	Information not available
Montezuma Hills Wind Project (34-37 MW)	Solano County	Information not available
Solano Wind Project Phase 3 (up to 128 MW)	Montezuma Hills, Solano County	Under environmental review
Hatchet Ridge Wind Project	Shasta County, Burney	Under construction
Lompoc Wind Energy Project	Lompoc, Santa Barbara County	Approved
Pacific Wind (Iberdrola)	McCain Valley, San Diego County	Under environmental review
TelStar Energies, LLC (300 MW)	Ocotillo Wells, Imperial County	Under environmental review
Geothermal Projects		
Buckeye Development Project	Geyserville, Sonoma	Under environmental review
Orni 18, LLC Geothermal Power Plant (49.9 MW)	Brawley, Imperial County	Information not available
Black Rock Geothermal 1,2,and 3	Imperial County	Information not available

* This list is compiled from the projects on CEQAnet as of November 2009 and the projects located on private or State lands that are listed on the Energy Commission Renewable Action Team website as requesting ARRA funding. Additional renewable projects proposed on private and State lands but not requesting ARRA funds are listed on the website.

Source: CEQAnet [http://www.ceqanet.ca.gov/ProjectList.asp], November 2009 and CEC Renewable Action Team – Generation Tracking for ARRA Projects 12/29/2009 [http://www.energy.ca.gov/33by2020/documents/2009-12-29/2009-12-29_Proposed_ARRA_Renewable_Projects.pdf]

Cumulative Scenario Table 2

Existing Projects along the I-10 Corridor (Eastern Riverside County)

ID	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
1	Interstate 10	Linear project running from Santa Monica to Blythe (in California)	Caltrans	Existing	N/A	Interstate 10 (I-10) is a major east-west route for trucks delivering goods to and from California. It is a 4l-ane divided highway in the Blythe region.
2	Chuckwalla Valley State Prison	19025 Wiley's Well Rd. Blythe, CA	CA Dept. of Corrections & Rehabilitation	Existing	1,080	State prison providing long-term housing and services for male felons classified as medium and low-medium custody inmates jointly located on 1,720 acres of State-owned property. APN 879040006,008, 012, 027, 028, 029, 030,
3	Ironwood State Prison	19005 Wiley's Well Rd. Blythe, CA	CA Dept. of Corrections & Rehabilitation	Existing	640	ISP jointly occupies with Chuckwalla Valley State Prison 1,720 acres of State-owned property, of which ISP encompasses 640 acres. The prison complex occupies approximately 350 acres with the remaining acreage used for erosion control, drainage ditches, and catch basins. 879040001, 004, 009, 010, 011, 015, 016, 017, 018, 019, 020
4	Devers-Palo Verde Transmission Line	From Midpoint Substation to Devers Substation	SCE	Existing	N/A	Existing 500 kV transmission line parallel to I-10 from Midpoint Substation, approximately 10 miles southwest of Blythe, to the SCE Devers Substation, near Palm Springs.
5	Blythe Energy Project	City of Blythe, north of I-10, 7 miles west of the CA/AZ border	Blythe Energy, LLC	Existing	76	520 MW combined-cycle natural gas-fired electric-generating facility. Project is connected to the Buck Substation owned by WAPA.
6	West-wide Section 368 Energy Corridors	Riverside County, parallel to DPV corridor	BLM, DOE, U.S. Forest Service	Approved by BLM and U.S. Forest Service	N/A	Designation of corridors on federal land in the 11 western states, including California, for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities (energy corridors). One of the corridors runs along the southern portion of Riverside County.
7	Eagle Mountain Pumping Plant	Eagle Mountain Road, west of Desert Center	Metropolitan Water District of Southern California	Existing		144 ft. pumping plant that is part of the Metropolitan Water District of Southern California's facilities. APNs 807150007, 807150009, 807150010
8	Recreational Opportunities	Eastern Riverside County	BLM	Existing	N/A	BLM has numerous recreational opportunities on lands in eastern Riverside County along the I-10 corridor including the Wiley's Well Campground, Coon Hollow Campground, and Midland Long-Term Visitor Area.
9	Kaiser Mine	Eagle Mountain, north of Desert Center	Kaiser Ventures, Inc.	Mining activities stopped in 1983.		Kaiser Steel mined iron ore at Kaiser Mine in Eagle Mountain and provided much of the Pacific Coast steel in the 1950s. Mining project also included the Eagle Mountain Railroad, 51 miles long. Imported steel captured market share in the 1960s and 1970s and primary steelmaking closed in the 1980s. 701380031

Cumulative Scenario Table 3

Future Foreseeable Projects along the I-10 Corridor (Eastern Riverside County)

ID	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
A	Four commercial projects	Blythe, CA	Various	Approved	N/A	Four commercial projects have been approved by the Blythe Planning Department including the Agate Road Boat & RV Storage, Riverway Ranch Specific Plan, Subway Restaurant and Motel, and Agate Senior Housing Development.
B	Intake Shell	Blythe, CA		Under Construction	N/A	Reconstruction of a Shell facility located at Intake & Hobsonway. Demolition occurred in 2008, reconstruction planned for 2009-2010.
C	Fifteen residential developments	Blythe, CA	Various	Approved/Under Construction	N/A	Twelve residential development projects have been approved by the Blythe Planning Department including: Vista Palo Verde (83 Single Family Residential [SFR]), Van Weelden (184 SFR), Sonora South (43 SFR), Ranchette Estates (20 SFR), Irvine Assets (107 SFR), Chanslor Village (79 SFR), St. Joseph's Investments (69 SFR), Edgewater Lane (SFR), The Chanslor Place Phase IV (57 SFR), Cottonwood Meadows (103 Attached SFR), Palo Verde Oasis Phase IV (29 SFR). Three residential development projects have been approved and are under construction including: The Chanslor Phase II & III (78 SFR), River Estate at Hidden Beaches, Mesa Bluffs Villas (26 Attached SFR).
D	Devers-Palo Verde 2 Transmission Line Project	From the Midpoint Substation to Devers Substation	SCE	Project was approved by CPUC 11/2009.	N/A	New 500 kV transmission line parallel to the existing Devers-Palo Verde Transmission Line from Midpoint Substation, approximately 10 miles southwest of Blythe, to the SCE Devers Substation, near Palm Springs. The ROW for the 500 kV transmission line would be adjacent to the existing DPV ROW and would require an additional 130 feet of ROW on federal and State land and at least 130 feet of ROW on private land and Indian Reservation land.
E	Colorado Substation	10 miles southwest of Barstow	SCE	Project was approved by CPUC 11/2009.	44	The new 500/230 kV substation would be constructed within a rectangular area approximately 1,000 feet by 1,900 feet, resulting in approximately 44 acres permanently disturbed. The 500 kV switching station would include buses, circuit breakers, and disconnect switches. The switchyard would be equipped with 108-foot-high dead-end structures. Outdoor night lighting would be designed to illuminate the switchrack when manually switched on.
F	Blythe Energy Project Transmission Line	From the Blythe Energy Project (Blythe, CA) to Devers Substation	Blythe Energy, LLC	Under construction	N/A	Transmission Line Modifications including upgrades to Buck Substation, approximately 67.4 miles of new 230 kV transmission line between Buck Substation and Julian Hinds Substation, upgrades to the Julian Hinds Substation, installation of 6.7 miles of new 230 kV transmission line between Buck Substation and SCE's DPV 500 kV transmission line.
G	Desert Southwest Transmission Line	118 miles primarily parallel to DPV	Imperial Irrigation District	Final EIR prepared 2005. Approved by the BLM in 2006.	N/A	New, approximately 118-mile 500 kV transmission line from a new substation/ switching station near the Blythe Energy Project to the existing Devers Substation located approximately 10 miles north of Palm Springs, California.

ID	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
H	Green Energy Express Transmission Line Project	70-mile transmission line from Eagle Mountain Substation to southern California	Green Energy Express LLC	September 9, 2009, Green Energy Express LLC filed a Petition for Declaratory Order requesting that FERC approve certain rate incentives for the project	N/A	70-mile double-circuit 500 kV transmission line and new 500/230 kV substation from near the Eagle Mountain Substation (eastern Riverside County) to Southern California
I	Blythe Energy Project II	Blythe, CA. Near the Blythe Airport and I-10	Blythe Energy, LLC	Approved December 2005	30 acres (located on Blythe Energy Project land)	520 MW combined-cycle power plant located entirely within the Blythe Energy Project site boundary. Blythe Energy Project II will interconnect with the Buck Substation constructed by WAPA as part of the Blythe Energy Project. Project is designed on 30 acres of a 76-acre site.
J	Eagle Mountain Pumped Storage Project	Eagle Mountain iron ore mine, north of Desert Center	Eagle Crest Energy Company	License application filed with FERC in June 2009	1,524	1,300 MW pumped storage project designed to store off-peak energy to utilize during on-peak hours. The captured off-peak energy will be used to pump water to an upper reservoir where the energy will be stored. The water will then be released to a lower reservoir through an underground electrical generating facility where the stored energy will be released back into the Southwestern grid during "high demand peak" times, primarily weekdays. Estimated water use is 8,100 AFY for the first 4y-ear start-up period and replacement water is 1,763 AFY thereafter. 1
K	Palen Solar Power Project	North of I-10, 10 miles east of Desert Center	Solar Millennium LLC/Chevron Energy	Undergoing environmental review, construction to begin end of 2010 with one unit online in 2012 and one unit online in 2013.	5,200	500 MW solar trough project on 5,200 acres. Facility would consist of two 250 MW plants. Approximately 3,870 acres would be disturbed. Project would include interconnection to the SCE Red Bluff Substation. Project would use 300 AFY.
L	Blythe Solar Power Project	North of I-10, immediately north of the Blythe Airport	Solar Millennium LLC/Chevron Energy	Undergoing environmental review	9,400	1,000 MW solar trough facility on 9,400 acres
M	NextEra (FPL) McCoy	Northwest of Blythe, CA, immediately north of Blythe Solar Power Project	NextEra (FPL)	Plan of Development in to Palm Springs BLM	20,608	250 MW solar trough project. ROW in process for monitoring water well drilling.
N	McCoy Soleil Project	10 miles northwest of Blythe	enXco	Plan of Development in to Palm Springs BLM	1,959	300 MW solar power tower project located on 1,959 acres. Project would require a 14 mile transmission line to proposed SCE Colorado Substation south of I-10. Would use 575-600 AFY.
O	Genesis Solar Energy Project	North of I-10, 25 miles west of Blythe and 27 miles east of Desert Center	NextEra (FPL)	Undergoing environmental review. Construction to begin at the end of 2010.		250 MW solar trough project located on 4,640 acres north of the Ford Dry Lake. Project includes 6m-ile natural gas pipeline and a 5.5m-ile gen-tie line to the Blythe Energy Center to Julian Hinds Transmission Line, then travel east on shared transmission poles to the Colorado River Substation.

ID	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
P	Big Maria Vista Solar Project	North of I-10, approximately 12 miles northwest of Blythe	Bullfrog Green Energy	Plan of Development submitted to BLM	2,684	500 MW solar photovoltaic project on 2,684 acres of land. Project would be built in three phases and would require 6,000 gallons of water monthly.
Q	Chuckwalla Solar I	1 mile north of Desert Center	Chuckwalla Solar I, LLC	Plan of Development submitted to BLM	4,083	200 MW solar photovoltaic project on 4,083 acres of land. Project would be developed in several phases and would tap into an existing SCE 161-kV transmission line crossing the site.
R	Rice Solar Energy Project	Rice Valley, Eastern Riverside County	Rice Solar Energy, LLC (SolarReserve, LLC)	Undergoing environmental review. Construction to begin in 2011	1,410	150 MW solar power tower project with liquid salt storage. Project is located on approximately 1,410 acres and includes a power tower approximately 650 feet tall and a 10-mile long interconnection with the WAPA Parker-Blythe transmission line.
S	Blythe Airport Solar I Project	Blythe Airport	U.S. Solar	Application has been submitted to City of Blythe, City of Blythe approved the project in November, 2009	640	100 MW solar photovoltaic project located on 640 acres of Blythe airport land.
T	Blythe PV Project	Blythe	First Solar	CPUC approved project terms of a 20 year power purchase agreement for sale of 7.5 MW, Under construction in forth quarter, 2009	200	7.5 MW solar photovoltaic project located on 200 acres. Project was constructed by First Solar and sold to NRG Energy.
U	Desert Quartzite	South of I-10, 8 miles southwest of Blythe	First Solar (previously OptiSolar)	POD in to BLM	7,724	600 MW solar photovoltaic project located on 7,724 acres. Adjacent to DPV transmission line and SCE Colorado Substation. Approximately 27 AF would be used during construction and 3.8 AFY during operation.
V	Desert Sunlight	North of Desert Center	First Solar (previously OptiSolar)	POD in to BLM	5,000-6,000	250 MW solar photovoltaic project located on 5,000-6,000 acres. Project would tie into the SCE Red Bluff Substation. Approximately 27 AF would be used during construction and 3.8 AFY during operation.
W	EnXco	North of Wileys Well Road, east of Genesis Solar Energy Project	enXco	POD in to BLM		300 MW solar photovoltaic project location on X acres.
X	Desert Lily Soleil Project	6 miles north of Desert Center	enXco		1,216	100 MW photovoltaic plant on 1,216 acres of BLM land. Would require a 5-8 mile transmission line to planned SCE Red Bluff Substation.
Y	Red Bluff Substation	Unknown at this time – near Desert Center	SCE		N/A	Proposed 230/500 kV Substation near Desert Center. Planned to interconnect renewable projects near Desert Center with the DPV transmission line.
Z	Chuckwalla Valley Raceway	Desert Center Airport (no longer a functioning airport)	Developer Matt Johnson	Under construction, track expected to be open in mid 2010	400	Proposed 500-mile race track located on 400 acres of land that used to belong to Riverside County and was used as the Desert Center airport. APN 811142016, 811142006

ID	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
AA	Eagle Mountain Landfill Project	Eagle Mountain, North of Desert Center	Mine Reclamation Corporation and Kaiser Eagle Mountain, Inc.	U.S. Court of Appeals for the Ninth Circuit issued its regarding the EIS for the project in 11/09 and ruled that the land exchange for the project was not properly approved by the administrative agency. Kaiser's Mine and Reclamation is considering all available options.	~ 3,500	The project proposed to develop the project on a portion of the Kaiser Eagle Mountain Mine in Riverside County, California. The proposed project comprises a Class III nonhazardous municipal solid waste landfill and the renovation and repopulation of Eagle Mountain Townsite. The proposal by the proponent includes a land exchange and application for rights-of-way with the Bureau of Land Management and a Specific Plan, General Plan Amendment, Change of Zone, Development Agreement, Revised Permit to Reclamation Plan, and Tentative Tract Map with the County. The Eagle Mountain landfill project is proposed to accept up to 20,000 tons of non-hazardous solid waste per day for 50 years.
AB	Wileys Well Communication Tower (part of the Public Safety Enterprise Communication System)	East of Wileys Well Road, just south of I-10	Riverside County	Final EIR for the Public Safety Enterprise Communication System published in August 2008.	N/A	The Public Safety Enterprise Communication project is the expansion of the County of Riverside's fire and law enforcement agencies approximately 20 communication sites to provide voice and data transmission capabilities to assigned personnel in the field.
AC	Mule Mountain Solar Project	South of I-10, approximately 4 miles west of Blythe	Bullfrog Green Energy	Plan of Development in to Palm Springs BLM	2,684	500 MW solar concentrating photovoltaic project located on 2,684 acres. Considering interconnection with proposed SCE Colorado Substation. Approximately 6,000 gallons of water would be required monthly.
Additional Projects Outside Cumulative Figure Boundaries						
	Paradise Valley "New Town" Development	Approximately 30 miles west of Desert Center (7 miles east of the city of Coachella)	Glorious Land Company	Notice of Preparation of an EIR published in December of 2005. Still under environmental review.	6,397	Company proposed to develop a planned community as an international resort destination with residential, recreational, commercial, and institutional uses and facilities. The project is planned as a self-contained community with all public and quasi-public services provided. The project is located outside the Coachella Valley Water District (CVWD) boundaries and the applicant has entered into an agreement with the CVWD to manage artificial recharge of the Shaver's Valley groundwater. The proponent has purchased a firm water supply from Rosedale-Rio Bravo Water District in Kern County. In-kind water will be transferred to the MWD which will release water from the Colorado River Aqueduct to a 38 acre percolation pond on the project site. The MWD will deliver approximately 10,000 AFY to the percolation pond and over the long term, no net loss of groundwater in storage is anticipated.

ID	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
	Proposed National Monument (former Catellus Lands)	Between Joshua Tree National Park and Mojave National Preserve		In December 2009, Senator Feinstein introduced bill S.2921 that would designate two new national monuments including the Mojave Trails National Monument.	941,000 acres	The proposed Mojave Trails National Monument would protect approximately 941,000 acres of federal land, including approximately 266,000 acres of the former railroad lands along historic Route 66. The BLM would be given the authority to conserve the monument lands and also to maintain existing recreational uses, including hunting, vehicular travel on open roads and trails, camping, horseback riding and rockhounding.
	BLM Renewable Energy Study Areas	Along the I-10 corridor between Desert Center and Blythe	BLM	Proposed		The DOE and BLM identified 24 tracts of land as Solar Energy Study Areas in the BLM and DOE Solar PEIS. These areas have been identified for in-depth study of solar development and may be found appropriate for designation as solar energy zones in the future.
	Solar Energy projects along Arizona Border	Approximately 15 miles east of the CA/ AZ border along I-10 corridor	Various	Applications filed in to Arizona BLM field offices, application status listed as pending.		Five solar trough and solar power tower projects have been proposed along the I-10 corridor approximately 15 miles east of the CA/AZ border. The projects have been proposed on BLM administered-land in the Yuma and Kingman Field Offices and have requested use of approximately 75,000 acres.

1 - Water usage for the Eagle Mountain Pumped Storage Project was based on the information provided to FERC by the Eagle Crest Energy Company in the Responses to Deficiency of License Application and Additional Information Request dated October 26, 2009.

B.3.5 REFERENCES

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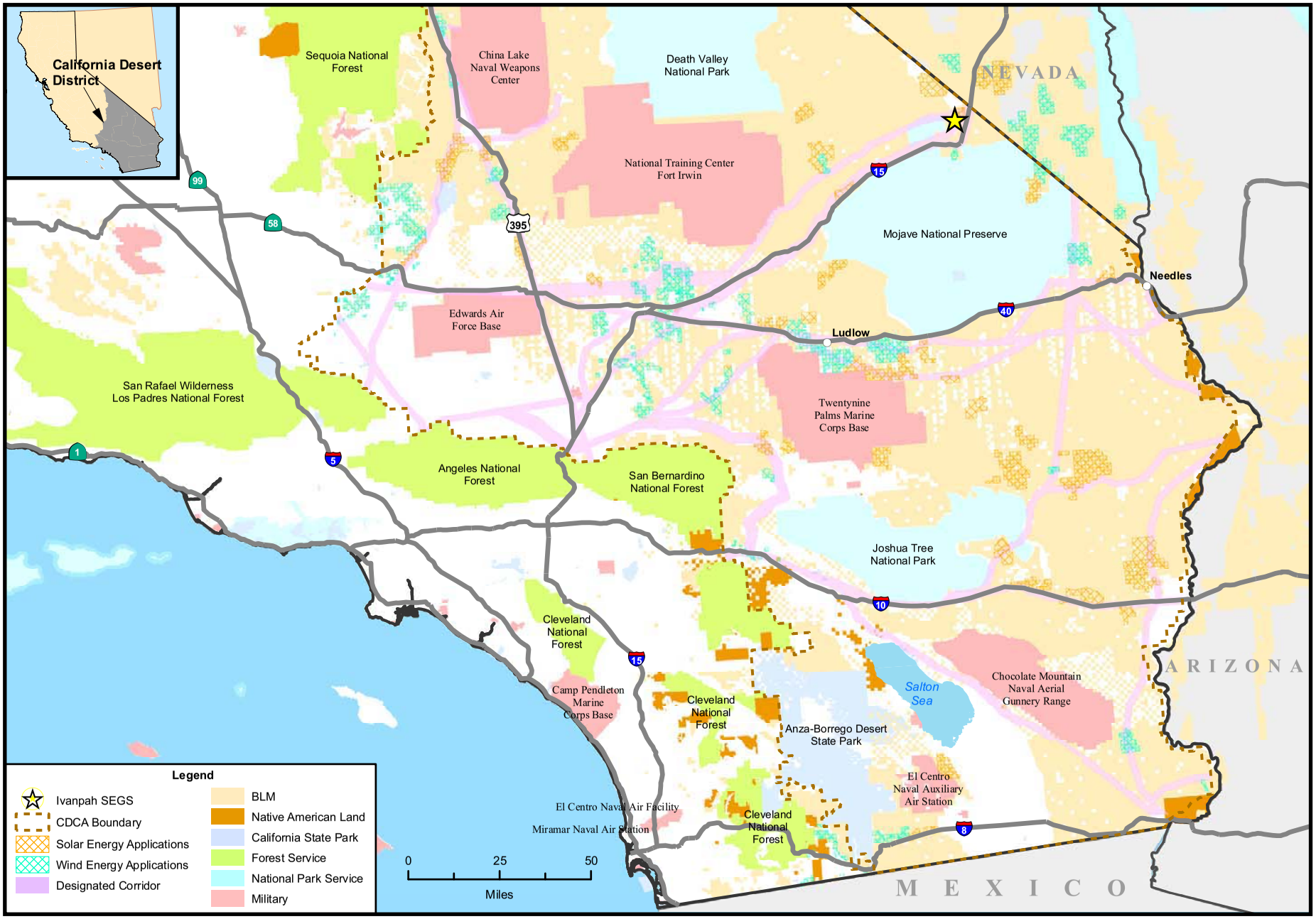
Solar Millennium2009a--Solar Millennium (tn: 52939). Application for Certification Vol 1 & 2, dated 8/24/2009.

West-wide Energy Corridor Programmatic EIS Information Center. <http://corridoreis.anl.gov/> Accessed November 2009.

CUMULATIVE IMPACTS - FIGURE 1

Palen Solar Power Project - Regional Renewable Applications



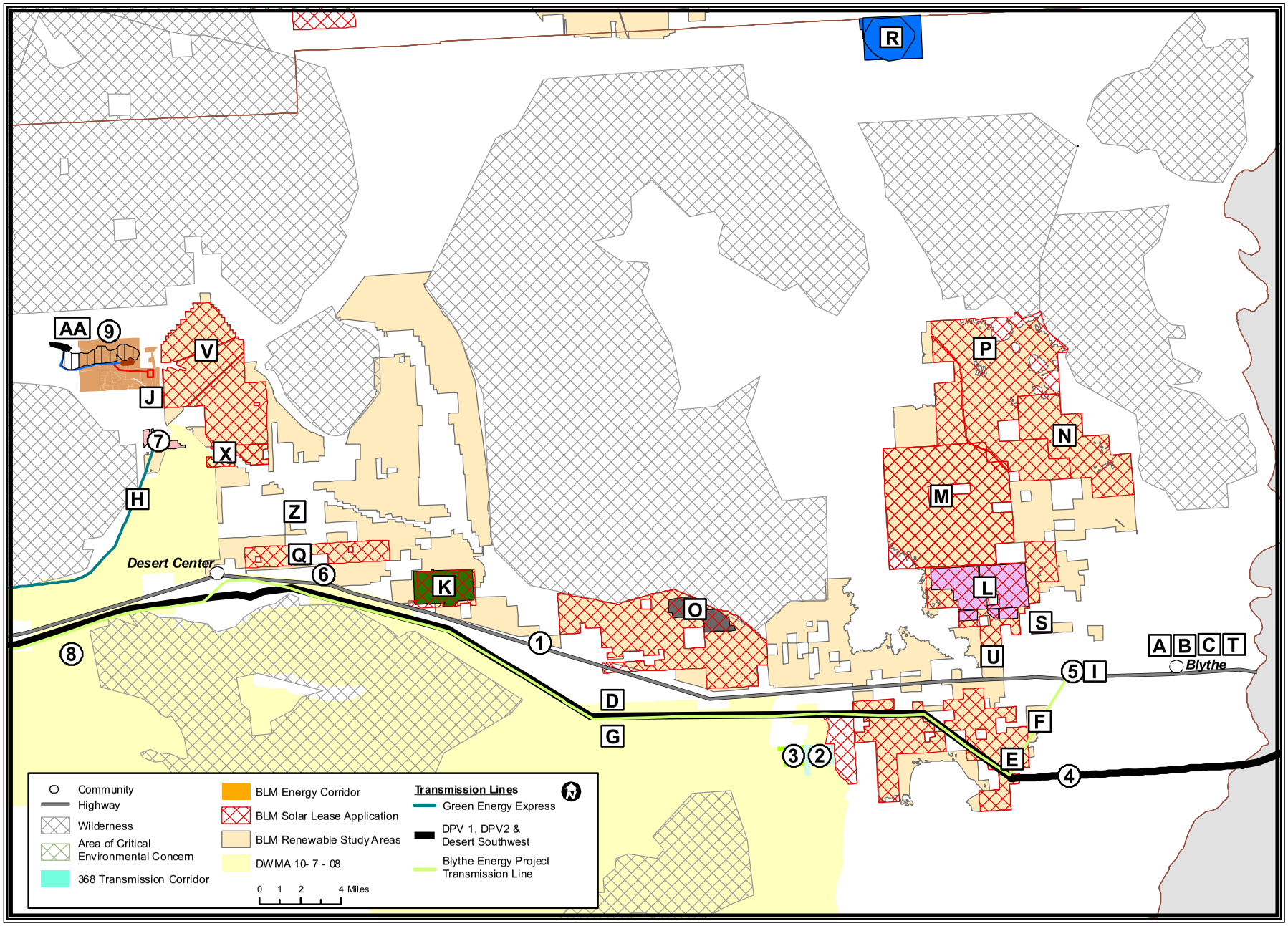
CUMULATIVE IMPACTS

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission

CUMULATIVE IMPACTS - FIGURE 2

Palen Solar Power Project - I-10 Corridor Existing and Future/Foreseeable Projects



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission, Bureau of Land Management

C. ENVIRONMENTAL ANALYSIS

C.1 – AIR QUALITY

Testimony of Joseph Hughes and William Walters, P.E.

C.1.1 SUMMARY OF CONCLUSIONS

California Energy Commission staff[1] ("staff") concludes that with the adoption of the attached conditions of certification the proposed Palen Solar Power Project would comply with all applicable laws, ordinances, regulations, and standards and would not result in any significant California Environmental Quality Act air quality impacts. These Conditions of Certification meet the Energy Commission's responsibility to comply with the California Environmental Quality Act (CEQA).

The Palen Solar Power Project would emit substantially lower greenhouse gas[2] emissions per megawatt-hour than fossil-fueled generation resources in California. The Palen Solar Power Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification, specifically the addition of staff condition AQ-SC11, will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

C.1.2 INTRODUCTION

Palen Solar I, LLC ("applicant") submitted an Application for Transmission and Utility Systems and Facilities on Federal Lands to the BLM on March 14, 2007 (CACA 048810) and an Application for Certification (AFC) to the California Energy Commission on August 24, 2009 to construct and operate a solar power plant in Riverside County, California. The proposed project would be a solar thermal process utilizing parabolic trough technology, producing approximately 500 megawatts (MW), occupying 2,970 acres. The project site is located approximately 10 miles east of Desert Center (population 125), Riverside County, California along U.S. Interstate 10 (I-10) approximately halfway between the cities of Indio and Blythe, California and about 3 miles east of the southeast end of Joshua Tree National Park.

This analysis evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the Palen Solar Power Project (PSPP or proposed project). Criteria air pollutants are defined as air contaminants for

[1] This analysis has been completed solely by Energy Commission staff and only reflects the findings and recommendations of Energy Commission staff. BLM will complete a separate Final Environmental Impact Statement for this project and the official federal findings and recommended mitigation measures will be provided in that document. Please see the Executive Summary of this Revised Staff Assessment (RSA) for more information regarding the separation of Energy Commission and BLM environmental review process.

[2] Greenhouse gas (GHG) emissions are not criteria pollutants, but they affect global climate change. In that context, staff evaluates the GHG emissions from the proposed project (Appendix Air-1), presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

which the state and/or federal governments, per the California Clean Air Act and the federal Clean Air Act, have established ambient air quality standards to protect public health.

The criteria pollutants analyzed within this section are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), and particulate matter (PM). Lead is not analyzed as a criteria pollutant, but lead and other toxic air pollutant emissions impacts are analyzed in the Public Health Section of this Revised Staff Assessment (RSA). Two subsets of particulate matter are inhalable particulate matter (less than 10 microns in diameter, or PM10) and fine particulate matter (less than 2.5 microns in diameter, or PM2.5). Nitrogen oxides (NOx, consisting primarily of nitric oxide [NO] and NO_2) and volatile organic compounds (VOC) emissions readily react in the atmosphere as precursors to ozone and, to a lesser extent, particulate matter. Sulfur oxides (SOx) readily react in the atmosphere to form particulate matter and are major contributors to acid rain. Global climate change and greenhouse gas (GHG) emissions from the proposed project are discussed in **Appendix Air-1** and analyzed in the context of cumulative impacts.

In carrying out this analysis, the California Energy Commission (Energy Commission) staff evaluated the following four major issues:

- whether PSPP is likely to conform with applicable federal, state, and South Coast Air Quality Management District (SCAQMD or District) air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));
- whether PSPP is likely to cause new violations of ambient air quality standards or contribute substantially to existing violations of those standards (Title 20, California Code of Regulations, section 1743);
- whether mitigation measures proposed for PSPP are adequate to lessen potential impacts under the California Environmental Quality Act (CEQA) to a level of insignificance (Title 20, California Code of Regulations, section 1742 (b)); and

C.1.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

A significant impact is defined under CEQA as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project” (Cal.Code Regs., tit. 14 [hereinafter CEQA Guidelines] Section 15382). Questions used in evaluating significance of air quality impacts are based on Appendix G of the CEQA Guidelines (CCR 2006). The specific approach used by Energy Commission staff in determining CEQA significance is discussed in more detail below.

C.1.3.1 LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The federal, state, and local laws and policies applicable to the control of criteria pollutant emissions and mitigation of air quality impacts for the PSPP are summarized in **Air Quality Table 1**. Staff’s analysis examines the proposed project’s compliance with these requirements.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards

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 delegated to South Coast Air Quality Management District (SCAQMD). Prevention of Significant Deterioration (PSD) requires major sources or major modifications to major sources to obtain permits for attainment pollutants. The PSPP is a new source that does not have a rule listed emission source thus the PSD trigger levels are 250 tons per year for NOx, VOC, SO_2, PM2.5 and CO.
40 CFR Part 60	New Source Performance Standards (NSPS), Subpart Dc Standards of Performance for Small Industrial-Commercial-Institutional Steam Generation Units. Establishes recordkeeping and reporting requirements for natural gas (including propane) fired steam generating units. Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Establishes emission standards for compressions ignition internal combustion engines, including emergency generator and fire water pump engines.
40 CFR Part 93 General Conformity	Requires determination of conformity with State Implementation Plan for projects requiring federal approvals if 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 generator and fire water pump engines.
Local (South Coast Air Quality Management District)	
Rules 201, 203, and 212 – Permit to Construct, Permit to Operate, and Standards for Approving Permits and Issuing Public Notice	Establishes the requirements to obtain a Permit to Construct and Permit to Operate for emission sources.
Rule 401 – Visible Emissions	Limits visible emissions.
Rule 402 – Nuisance	Prohibits the discharge of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to the public or which endanger the comfort, response, health or safety of the public or which cause injury or damage to business or property.
Rule 403 – Fugitive Dust	Limits fugitive emissions from certain bulk storage, earthmoving, construction and demolition, and manmade conditions that may cause wind erosion.

Applicable LORS	Description
Rule 404 – Particulate Matter Concentration	The rule limits particulate matter (PM) emissions. PM emission limits included in the rule are functions of the exhaust flow rate from the regulated device.
Rule 409 – Combustion Contaminants	Limits combustion contaminant discharge into the atmosphere from fuel burning equipment to 0.1 grain or less per cubic foot of gas calculated to 12% of carbon dioxide (CO_2) at standard conditions.
Rule 431.1 – Sulfur Compounds of Gaseous Fuels	Limits discharge into the atmosphere of sulfur compounds from the burning of gaseous fuels.
Rule 431.2 – Sulfur Compounds of Liquid Fuels	Limits discharge into the atmosphere of sulfur compounds from the burning of liquid fuels.
Rule 463 – Organic Liquids Storage	Sets standards for storage of organic liquids with a true vapor pressure of 0.5 pounds per square inch or greater.
Rule 474–Fuel Burning Equipment–Oxides of Nitrogen	Limits the discharge of NO_2 to the atmosphere to the concentrations specified in the rule.
Regulation IX – New Source Performance Standard	Incorporates the Federal NSPS (Title 40 CFR 60) rules by reference.
Rule 1110.2 – Emissions From Gaseous and Liquid-Fueled Internal Combustion Engines	The purpose of this rule is to reduce NOx, VOCs, and CO from engines.
Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional and Commercial Boilers, Steam Generators and Process Heaters	This rule limits NOx emissions from boilers, steam generators, and process heaters.
Rule 1166 – VOC Emissions from Decontamination of Soil	Establishes requirements to control VOC emissions from handling of VOC-contaminated soil.
Regulation XIII – New Source Review	Establishes the pre-construction review requirements, including Best Available Control Technology and emission offset requirements for new, modified or relocated facilities to ensure that these facilities do not interfere with progress in attainment of the national ambient air quality standards.

C.1.3.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff assesses four kinds of primary and secondary[3] impacts: construction, operation, closure and decommissioning, and cumulative. Construction impacts result from the onsite and offsite emissions occurring during site preparation and construction of the proposed project. Operation impacts result from the emissions of the proposed project during operation, which includes all of the onsite auxiliary equipment emissions (boilers, emergency engines, etc.), the onsite maintenance vehicle emissions, and the offsite employee and material delivery trip emissions. Closure and decommissioning impacts occur from the onsite and offsite emissions that would result from dismantling the facility and restoring the site. Cumulative impacts

[3] Primary impacts potentially result from facility emissions of NOx, SOx, CO and PM10/2.5. Secondary impacts result from air contaminants that are not directly emitted by the facility but formed through reactions in the atmosphere that result in ozone, and sulfate and nitrate PM10/PM2.5.

analysis assesses the impacts that result from the proposed project's incremental effect viewed over time, 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. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.)

C.1.3.3 METHOD AND THRESHOLD FOR DETERMINING CEQA SIGNIFICANCE

Energy Commission staff evaluates potential impacts per Appendix G of the CEQA Guidelines (CCR 2006). A CEQA significant adverse impact is determined to occur if potentially significant CEQA impacts cannot be mitigated through the adoption of Conditions of Certification. Specifically, Energy Commission staff uses health-based ambient air quality standards (AAQS) established by the ARB and the U.S.EPA as a basis for determining whether a project's emissions will cause a significant adverse impact under CEQA. The standards are set at levels that include a margin of safety and are designed to adequately protect the health of all members of the public, including those most sensitive to adverse air quality impacts such as the aged, people with existing illnesses, children, and infants. Staff evaluates the potential for significant adverse air quality impacts by assessing whether the project's emissions of criteria pollutants and their precursors (NOx, VOC, PM10 and SO_2) could create a new AAQS exceedance (emission concentrations above the standard), or substantially contribute to an existing AAQS exceedance.

Staff evaluates both direct and cumulative impacts. Staff will find that a project or activity will create a direct adverse impact when it causes an exceedance of an AAQS. Staff will find that a project's effects are cumulatively considerable when the project emissions in conjunction with ambient background, or in conjunction with reasonably foreseeable future projects, substantially contribute to ongoing exceedances of an AAQS. Factors considered in determining whether contributions to ongoing exceedances are substantial include:

1. the duration of the activity causing adverse air quality impacts;
2. the magnitude of the project emissions, and their contribution to the air basin's emission inventory and future emission budgets established to maintain or attain compliance with AAQS;
3. the location of the project site, i.e., whether it is located in an area with generally good air quality where non-attainment of any ambient air quality standard is primarily or solely due to pollutant transport from other air basins;
4. the meteorological conditions and timing of the project impacts, i.e., do the project's maximum modeled pollutant impacts occur when ambient concentrations are high (such as during high wind periods, or seasonally);
5. the modeling methods, and how refined or conservative the impact analysis modeling methods and assumptions were and how that may affect the determined adverse impacts;
6. the project site location and nearest receptor locations; and whether the identified adverse impacts would also occur at the maximum impacted receptor location; and,

7. potential for future cumulative impacts; and whether appropriate mitigation is being recommended to address the potential for impacts associated with likely future projects.

C.1.3.4 NEPA AIR QUALITY ANALYSIS METHODOLOGY

Not applicable.

C.1.3.5 IMPACTS FROM CLOSURE AND DECOMMISSIONING

Impacts from closure and decommissioning, as a one-time limited duration event, are evaluated with the same methods as construction emissions as discussed above.

C.1.4 PROPOSED PROJECT

C.1.4.1 SETTING AND EXISTING CONDITIONS

Climate and Meteorology

The Mojave Desert Air Basin (MDAB) is an assemblage of mountain ranges interspersed with long broad valleys that often contain dry lakes. Many of the lower mountains which dot the vast terrain rise from 1,000 to 4,000 feet above the valley floor. Prevailing winds in the MDAB are out of the west and southwest. These prevailing winds are due to the proximity of the MDAB to coastal and central regions and the blocking nature of the Sierra Nevada mountains to the north; air masses pushed onshore in southern California by differential heating are channeled through the MDAB (MDAQMD 2009). MDAB has a typical desert climate characterized by low precipitation, hot summers, mild winters, low humidity, and strong temperature inversions. Total rainfall in Desert Center averages just less than 4 inches per year with about 50% of the total rainfall occurring during the December through March winter rainy season, and about 30% occurring during the August/September summer monsoon season (WC 2009). On average August is the wettest month.

The highest monthly average high temperature is 104°F in July and the lowest average monthly low temperature is 45°F in January and December (WC 2009). The applicant provided a wind rose from Blythe Airport for the years 2003 to 2007. This wind data indicates the highest annual wind direction frequencies are from the south through the southwest. Due to the topography of the particular site, staff would expect a more westerly wind direction. Calm conditions occur approximately 17% of the time, with the annual average wind speed approximately 8.5 miles per hour (mph).

Sensitive Receptors

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. There are no sensitive receptors identified within the 3-mile radius of the project site. The nearest sensitive receptor (Eagle Mountain Elementary School) is approximately 10 miles west of the proposed project in the City of Blythe. There are active agricultural fields and residences located to the northwest of the project site, and the nearest residential

receptor is located adjacent to the northwestern project site boundary and 1,000 feet away from the edge of the Solar Unit #2 solar fields.

Existing Ambient Air Quality

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, are typically lower (more protective) than the federal AAQS, which are established by the United States Environmental Protection Agency (U.S.EPA). The state and federal air quality standards are listed in **Air Quality Table 2**. The averaging times for the various air quality standards, the times over which they are measured, range from one hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 or $\mu g/m^3$, respectively).

Air Quality Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.075 ppm[a] (147 μg/m^3)	0.070 ppm (137 μg/m^3)
	1 Hour	—	0.09 ppm (180 μg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 μg/m^3)	0.03 ppm (57 μg/m^3)
	1 Hour	0.100 ppm[b]	0.18 ppm (339 μg/m^3)
Sulfur Dioxide (SO_2)	Annual	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%.

Notes:
a - The 2008 standard is shown above, but as of September 16, 2009 this standard is being reconsidered. The 1997 8-hour standard is 0.08 ppm.
b - The U.S. EPA is in the process of implementing this new standard, which became effective April 12, 2010. This standard is based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations.
Source: ARB 2009a.

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

area could be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same air contaminant.

The project site is located in the Mojave Desert Air Basin (MDAB) and is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The Riverside County portion of the MDAB is designated as non-attainment for the state ozone and PM10 standards. This area is designated as attainment or unclassified for all federal criteria pollutant ambient air quality standards and the state CO, NOx, SOx, and PM2.5 standards. **Air Quality Table 3** summarizes the project site area's attainment status for various applicable state and federal standards.

Air Quality Table 3
Federal and State Attainment Status – Project Site Area within Riverside County

Pollutant	Attainment Status[1]	
	Federal	State
Ozone	Attainment[2]	Moderate Nonattainment
CO	Attainment	Attainment
NO_2	Attainment[3]	Attainment
SO_2	Attainment	Attainment
PM10	Attainment[2]	Nonattainment
PM2.5	Attainment	Attainment

Notes:
1 - Attainment = Attainment or Unclassified, where Unclassified is treated the same as Attainment for regulatory purposes.
2 - Attainment status for the site area only, not the entire MDAB.
3 - Nitrogen dioxide attainment status for the new federal 1-hour NO2 standard is scheduled to be determined by January 2012.
Source: ARB 2009b, U.S.EPA 2009a.

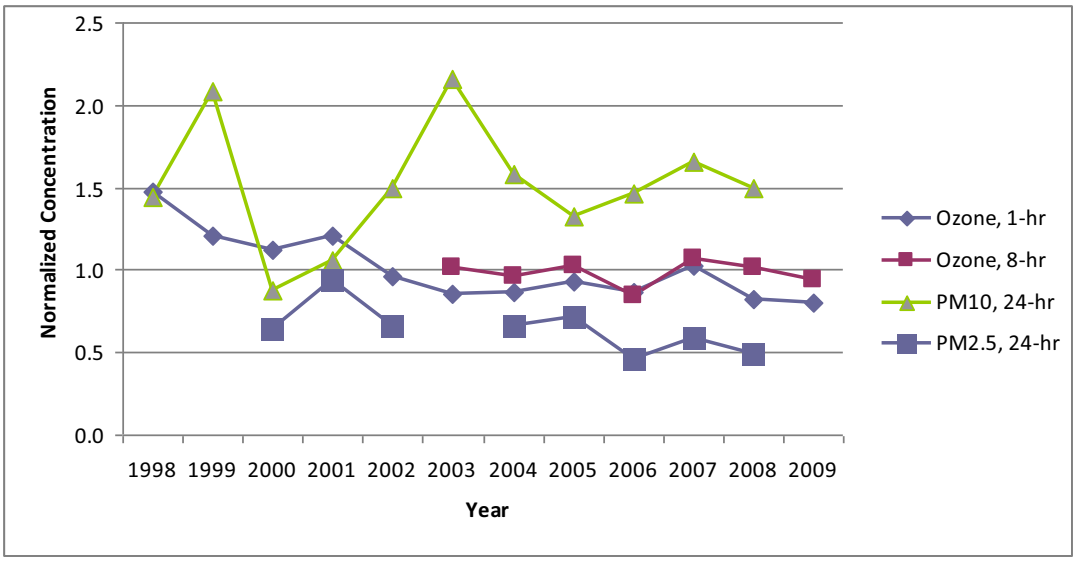
Ambient air quality monitoring data for ozone, PM10, PM2.5, CO, NO_2, and SO_2, compared to most restrictive applicable standards for the years between 2004 through 2009 at the most representative monitoring stations for each pollutant are shown in **Air Quality Table 4** and the 1-hour and 8-hour ozone, and 24-hour PM10 and PM2.5 data for the years 1998 through 2009 (2008 for PM10 and PM2.5) are shown in **Air Quality Figure 1**. Ozone data are from the Blythe–445 West Murphy Street monitoring station, PM10, PM2.5, NO_2 and CO data are from the Palm Springs-Fire Station monitoring station and SO_2 data are from the Victorville–14306 Park Avenue monitoring station.

Air Quality Table 4
Criteria Pollutant Summary
Maximum Ambient Concentrations (ppm or μg/m^3)

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

Notes:
[a] - Exceptional PM concentration events, such as those caused by wind storms are not shown where excluded by U.S.EPA; however, some exceptional events may still be included in the data presented.
[b] - The PM10 data source is in the Coachella Valley that is classified as a serious PM10 nonattainment area.
[c] - The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.
Source: ARB 2009c, U.S.EPA 2009b, SCAQMD 2009.

Air Quality Figure 1
1998-2009 Historical Ozone and PM Air Quality Data
Blythe and Palm Springs Monitoring Stations, Riverside County [a, b, c]



Notes: a - The highest measured ambient concentrations of various criteria air contaminants were divided by their applicable standard and provided as a graphical point. Any point on the chart that is greater than one means that the measured concentrations of such air contaminant exceed the standard, and any point that is less than one means that the respective standard is not exceeded for that year. For example the 24-hour PM10 concentration in 2008 is 75 μg/m^3/50 μg/m^3 standard = 1.5.
b - All ozone data are from Blythe–445 West Murphy Street monitoring station. 8-hr ozone data was not available for this station before 2003.
c - All PM data are from Palm Springs monitoring station. 24-hr PM2.5 data was not available for this station before 2000.
Source: ARB 2009c, U.S.EPA 2009b, SCAQMD 2009.

Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted nitrogen oxides (NOx) and hydrocarbons (Volatile Organic Compounds [VOC]) in the presence of sunlight to form ozone. Pollutant transport from the South Coast Air Basin (Los Angeles Area) is one source of the pollution experienced in the eastern Riverside County portion of the MDAB (SCAQMD 2007, p. 1-2).

As **Air Quality Table 4** and **Air Quality Figure 1** indicate, the 1-hour and 8-hour ozone concentrations measured at the eastern border of Riverside County have been very slowly decreasing over time. The collected air quality data (not shown) indicate that the ozone violations occurred primarily during the sunny and hot periods typical during May through September.

Nitrogen Dioxide

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

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

Carbon Monoxide

The area is classified as attainment for the state and federal 1-hour and 8-hour CO standards. The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. The project area, in comparison with major urban areas, has a lack of substantial mobile source emissions and based on the Palm Springs-Fire Station monitoring site data, the local CO concentrations are expected to be well below the state and federal ambient air quality standards.

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

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

The area is non-attainment for the state PM10 standards. **Air Quality Table 4** and **Air Quality Figure 1** shows recent PM10/PM2.5 concentrations from a station in the adjacent Coachella Valley portion of the Salton Sea Air Basin (SSAB), which are

assumed to provide a conservative basis for the project site area. The figure shows fluctuating concentrations patterns, and shows clear exceedances of the state 24-hour PM10 standard. It should be noted that exceedance does not necessarily mean violation or nonattainment, as exceptional events do occur and some of those events, which do not count as violations, may be included in the data.

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

Portions of the MDAB are classified as non attainment for the federal PM10 standards and the state and federal PM2.5 standards; however, the project site is located in an unclassified or attainment portion of the MDAB for these standards. This divergence in the PM10 and PM2.5 concentration levels and attainment status indicate that a substantial fraction of the ambient particulate matter levels are most likely due to localized fugitive dust sources, such as vehicle travel on unpaved roads, agricultural operations, or wind-blown dust.[4]

Sulfur Dioxide

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

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

Summary

In summary, staff recommends the background ambient air concentrations in **Air Quality Table 5** for use in the modeling and impacts analysis. The recommended background concentrations are based on the maximum criteria pollutant concentrations from the past three years of available data collected at the most representative monitoring stations surrounding the project site.

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

Air Quality Table 5
Staff Recommended Background Concentrations (μg/m^3) [5]

Pollutant	Averaging Time	Recommended Background	Limiting AAQS [b]	Percent of Standard
NO_2	1 hour	119	339	35%
	Annual	19	57	33%
CO	1 hour	2,645	23,000	12%
	8 hour	878	10,000	9%
PM10	24 hour	83	50	166%
	Annual	30.5	20	153%
PM2.5	24 hour [a]	20.5	35	59%
	Annual	8.7	12	73%
SO_2	1 hour	23.6	655	4%
	3 hour	15.6	1,300	1%
	24 hour	13.1	105	12%
	Annual	3.5	80	4%

Source: ARB 2009c, U.S.EPA 2009b and Energy Commission Staff Analysis
Notes:
[a] PM2.5 24-hour data shown in **Air Quality Table 4** are 98th percentile values which is the basis of the ambient air quality standard and the basis for determination of the recommended background concentration.
[b] The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.

Where possible, staff prefers that the recommended background concentration measurements come from nearby monitoring stations with similar characteristics. For this proposed project the Blythe monitoring station (ozone), at approximately 35 miles east of the project site, is the closest monitoring station. The Palm Springs monitoring station (PM10, PM2.5, NO_2, and CO) is located approximately 75 miles west of the project site. The Victorville monitoring station (SO_2) is located approximately 135 miles west northwest of the project site. In general, the Palm Springs and Victorville monitoring stations are considered to provide conservative estimates of the worst case background concentrations due to their proximity to the South Coast Air Basin (Metropolitan Los Angeles). Monitoring stations located in Imperial County were not selected or considered as representative due to the predominant air flow patterns and due to air pollution from Mexico that creates a significant local influence for the worst-case pollutant concentration readings within Imperial County.

The background concentrations for PM10 are well above the most restrictive existing ambient air quality standards, while the background concentrations for the other pollutants are all below the most restrictive existing ambient air quality standards.

The pollutant modeling analysis was limited to the pollutants listed above in **Air Quality Table 5**; therefore, recommended background concentrations were not determined for the other criteria pollutants (ozone, lead, visibility, etc.).

[5] This table has been updated since the publication of the SA/DEIS to use peak values from 2007 to 2009 background data, for gaseous pollutants, where 2009 data was not available prior to publication of the Staff Assessment/Draft Environmental Impact Study, which shows an improvement in worst-case background concentrations for many of the criteria pollutants included in the air dispersion modeling analysis.

C.1.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff provided a number of data requests regarding the construction and operations emission estimates and air dispersion modeling analysis (CEC 2009d), which the applicant responded to by providing revised emissions estimates (AECOM 2010a) and substantially revised and more robust dispersion modeling analysis (Solar Millennium 2010a). Staff has reviewed the revised emission estimates and air dispersion modeling analysis[6] and finds them to be reasonable considering the level of emissions mitigation now stipulated to by the applicant.

Project Description

The PSPP is a concentrated solar thermal electric generating facility with two adjacent (Unit #1 and Unit #2), independent, and identical solar plants of 250 megawatt (MW) nominal capacity each for a total nominal capacity of 500 MW. The PSPP would be located in the Southern California inland desert, approximately 10 miles east of the small community of Desert Center, in eastern Riverside County, California. PSPP facilities would occupy approximately 2,970 acres of public lands owned by the Federal government for which a right-of-way (ROW) lease is being obtained by the Applicants from the Bureau of Land Management (BLM).

The PSPP would utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola. A heat transfer fluid (HTF), which in this case is Therminol® VP-1 — an organic fluid composed of biphenyl and diphenyl oxide — is heated to high temperatures (750°F [degrees Fahrenheit]) as it circulates through the receiver tubes. The heated HTF is then piped through a series of heat exchangers where it releases its stored heat to generate high pressure steam. The steam is then fed to a traditional steam turbine generator to produce electricity.

Units #1 and #2 would be developed in phases with construction scheduled to begin in late 2010 and continue through the fourth quarter of 2013. Commercial operation of Unit #1 would be expected to begin in mid-2013, with commercial operation of Unit #2 following by the end of 2013.

The main operation area (solar field and power block) of Units #1 and #2 would occupy about 1,380 acres each. The two plants would share a main office building, a main warehouse / maintenance building, a parking lot, and a bioremediation/land farming area for HTF contaminated soil, all located to the south of the solar fields. The two units would also share a storage tank for reverse osmosis (RO) concentrate (located in Unit #1) and a central internal switchyard located north of the solar fields. The main access road into the site would be located southwest of Unit #2.

Each power plant would have its own solar field, comprised of solar collector loops arranged in parallel groups connected to supply and return header piping. The power block would be located centrally within the solar field. Each power block would have its

[6] This includes a review of the emission source inputs, including the type of source (point, volume, area) and the variables used to describe each source (emissions, height, location, temperature, etc. as appropriate).

own administration, control, warehouse, maintenance, and lab buildings; HTF pumping and freeze protection system; solar steam generators; propane gas-fired auxiliary boiler; steam turbine generator; an air-cooled condenser; onsite transmission lines and electrical system; and various auxiliary equipment. The proposed project would generate electric power solely via solar energy. Propane would be used to fire an auxiliary boiler over night to support rapid start-up each morning and provide HTF freeze protection.

Both Units #1 and #2 would have water pipelines from onsite wells to their respective water treatment units. Transmission lines would connect each turbine generator to a central internal switchyard. From this switchyard, a new double-circuited 230 kilovolt (kV) transmission line would interconnect with Southern California Edison's (SCE) regional transmission system at the planned Red Bluff substation. The length of the new transmission line would be approximately 11.5 miles. The PSPP is located in the arid desert of Southern California where water consumption is of concern. Consistent with State policy, the proposed project would drastically reduce water use by utilizing air cooled condensers (ACC), an alternative cooling method commonly referred to as dry cooling. Water would be used for solar mirror washing, boiler feedwater makeup, firewater supply, dust control, and onsite domestic use. Total consumption for both units is estimated at approximately 300 acre-feet annually.

Project Emissions

Project Construction

The total duration of project construction for PSPP is estimated to be approximately 39 months, and would include construction of the two solar fields and two power blocks. Different areas within the project site and the construction laydown areas would be disturbed at different times over the period. Total construction disturbance area would be approximately 5,200 acres, and the permanent disturbance area of the project operations would be approximately 2,970 acres. Construction elements of the PSPP would include the two solar power plants (power block and solar array, as well as other ancillary facilities such as the administration buildings, warehouse, and parking lot), an electric transmission line to a substation located approximately 11.5 miles to the west, access roads, and rerouted drainage channels.

Combustion emissions would result from the off-road construction equipment, including diesel construction equipment used for site grading, excavation, and construction of onsite structures, and water and soil binder spray trucks used to control construction dust emissions; and off-road construction equipment used at the onsite batch plant. Fuel combustion emissions also would result from exhaust from on-road construction vehicles, including heavy duty diesel trucks used to deliver materials, other diesel trucks used during construction, and worker personal vehicles and pickup trucks used to transport workers to and from and around the construction site. Fugitive dust emissions would result from site grading/excavation activities, installation of a temporary 12 kV construction power transmission and the new project power transmission lines, completion of onsite wells and water pipelines, construction of power plant facilities, roads, and substations, the use of an onsite batch plant, and vehicle travel on paved and unpaved roads. There will also be emissions associated with the use of an onsite fuel depot.

The annual emissions for the shorter duration offsite construction activities are based on the following construction durations:

- Access Road Construction – 1 months
- Transmission Line Construction – 7 months

The applicant's mitigated maximum daily and annual construction emission estimates for the entire proposed project are provided below in **Air Quality Tables 6** and **7**.

Air Quality Table 6
PSPP Construction - Maximum Daily Emissions (lbs/day)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Construction Emissions						
Main Power Block (entire project)						
Off-road Equipment Exhaust	1,412.15	165.52	670.28	60.83	55.96	3.09
On-road Vehicles	36.74	2.69	17.22	1.21	1.11	0.05
Asphaltic Paving	--	0.00	--	--	--	--
Fugitive Dust from Paved Roads	--	--	--	5.24	0.89	--
Fugitive Dust from Unpaved Roads	--	--	--	585.25	124.09	--
Fugitive Dust from Constr. Activities	--	--	--	691.68	143.87	--
Batch Plant Emissions	17.86	1.30	9.84	17.48	17.48	0.03
Fuel Depot	--	6.17	--	--	--	--
Subtotal - Power Block Onsite Emissions	**1,466.75**	**175.68**	**697.34**	**1,361.7**	**343.4**	**3.16**
Power Block On-road Equipment (offsite)	330.06	78.79	852.08	149.72	36.18	1.37
Access Road Construction (offsite)	73.42	6.76	35.86	25.95	7.57	0.14
Transmission Line Construction (offsite)	19.30	2.91	30.21	12.01	3.21	0.06

Source: AECOM 2010a, Tables E.2-7, E.2-10, & E.2-12, Galati & Blek2010i.
Note: Emissions that were not added may not be additive due to occurring at different times during the construction schedule, and all emissions include fugitive dust as appropriate.

Air Quality Table 7
PSPP Construction - Maximum Annual Emissions (tons/year)

	NOx	VOC	CO	PM10	PM2.5	SOx
Construction Emissions						
Main Power Block (entire project)						
Off-road Equipment Exhaust	164.32	19.53	82.28	7.53	7.01	0.36
On-road Vehicles	4.90	0.31	2.05	0.16	0.15	0.01
Asphaltic Paving	--	0.03	--	--	--	--
Fugitive Dust from Paved Roads	--	--	--	0.64	0.11	--
Fugitive Dust from Unpaved Roads	--	--	--	71.14	15.17	--
Fugitive Dust from Constr. Activities	--	--	--	73.33	15.08	--
Batch Plant Emissions	2.14	0.16	1.18	2.3	2.3	0.00
Fuel Depot	--	1.13	--	--	--	--
Subtotal - Power Block Onsite Emissions	**171.37**	**21.16**	**85.51**	**155.1**	**39.83**	**0.37**
Power Block On-road Equipment (offsite)	36.82	9.00	95.73	16.9	4.19	0.16
Access Road Construction (offsite)	0.81	0.07	0.39	0.29	0.08	0.00
Transmission Line Construction (offsite)	0.90	0.17	1.84	0.60	0.23	0.16

Source: AECOM 2010a, Tables E.2-7, E.2-10, & E.2-12, Galati & Blek2010i.
Note: Emissions that were not added may not be additive due to occurring at different times during the construction schedule, and all emissions include fugitive dust as appropriate.

Project Operation

The PSPP facility would be a nominal 500 Megawatt (MW) solar electrical generating facility. The direct air pollutant emissions from power generation are negligible; however, there are auxiliary equipment and maintenance activities necessary to operate and maintain the facility.

The following are the stationary and mobile emission source operating assumptions that were used to develop the operation emissions estimates for the PSPP:

Stationary Emission Sources

PSPP would consist of two power plant units at the facility, each of which consists of the following equipment and emission estimate bases:

- One 35-MMBtu/hr propane or liquefied petroleum gas (LPG) fired auxiliary boiler used for startup and HTF freeze protection; daily emissions based on 5 hrs/day at 25 percent load and 12 hours per day at full load. Annual emissions based on 5,100 hr/year with duty cycle of 10 percent at full load and 90 percent at 25 percent load.
- One 300 hp diesel-fired emergency fire water pump engine; testing one hour test per week, not to exceed 50 hours per year.
- One 2,922 hp diesel-fired emergency generator engine; testing one hour test per week, not to exceed 50 hours per year.
- One two-cell cooling tower; Circulation rate of 6,034 gallons per minute, 2000 milligrams per liter Total Dissolved Solids (TDS), drift eliminator with drift losses of less than or equal to 0.0005 percent, max run time of 24 hr/day and 8,760 hr/year.
- One HTF ullage system; VOC control efficiency of 98 percent, limited to 0.75 lb/hr or 1.5 lb/day, operation is estimated at 2 hours per day and 400 hrs/year.
- HTF piping system. Assumes 3,050 valves, 4 pump seals, 7,594 connectors, and 10 pressure relief valves for each unit. The HTF piping system fugitive emissions have been recalculated by staff, consistent with the procedures developed by Kern County Air Pollution Control District that consider the properties of the HTF during the daily operation cycle, where it is assumed that for 16 hours per day the HTF in the piping system is consistent with the properties of a light liquid and for 8 hours per day the HTF in the piping system is consistent with the properties of a heavy liquid. The specific emission factors used are as follows:

Piping Component	Light Liquid Emission Factor (lb/hr/source)	U.S.EPA Reference Table	Heavy Liquid Emission Factor (lb/hr/source)	U.S.EPA Reference Table
Valves	5.55E-04	Table 2-9 (100 ppm)	1.90E-05	Table 2-4 (Heavy Oil)
Pump Seals	1.86E-03	Table 2-9 (100 ppm)	5.30E-05	Table 2-12 (Zero Factor)
Flanges/Connectors	1.65E-05	Table 2-12 (Zero Factor)	1.65E-05	Table 2-12 (Zero Factor)
Pressure Relief Valves	9.85E-02	Table 2-5 (<10,000 ppm)	1.90E-05	Table 2-4 (Heavy Oil)

Source: USEPA 1995.
Note: for pressure relief valves the in service emission factors are for gas service, rather than light liquid service.

These emission factors may not assume appropriate control efficiencies for the inspection and maintenance program required by SCAQMD. Staff will update this

emission estimate, if necessary, after receipt of the SCAQMD Final Determination of Compliance for this project and further consideration of the effectiveness of the inspection and maintenance program.

- One Fuel Depot consisting of one 500 gallon gasoline tank and two 10,000 gallon diesel tanks.

Mobile Emissions Sources

- Staff has included emissions for employee trips, assuming 134 employees per day averaging 95 miles round trip per employee.
- Mobile emissions sources required for operation and maintenance were estimated by the applicant based on vehicle miles traveled (VMT) and operating hours. For example, a mirror washing cycle or event can be completed in three days, which would allow for approximately 78 washing events per year, but it was assumed that washing would only be required once per week during October through March and twice a week during April through September, for a total of 78 washing events per year (AECOM 2010a, DR-AIR-15 and Galati & Blek 2010i, p.7). Each mobile source type has a different basis for emissions estimates as provided in the applicant's revised emission estimate spreadsheets (Galati & Blek 2010i).

The PSPP onsite stationary and onsite and offsite mobile source emissions, totaled for both power units, are estimated and summarized in **Air Quality Tables 8** and **9**.

Air Quality Table 8
PSPP Operations - Maximum Daily Emissions (lbs/day)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Operation Emissions						
Auxiliary Boilers	10.30	4.64	34.84	9.28	9.28	10.48
Emergency Fire Pump Engines	3.77	0.20	3.44	0.20	0.20	0.01
Emergency Generators	58.70	3.09	33.47	1.93	1.93	0.06
Auxiliary Cooling Towers	---	---	---	1.45	1.45	--
HTF Vents	---	3.00	---	---	--	---
HTF Fugitives	---	92.89	--	--	--	--
Onsite Maintenance Vehicles	0.86	0.09	0.56	310.06	65.76	0.01
Fuel Depot	--	0.45	--	--	--	--
Subtotal of Onsite Emissions	**73.63**	**104.36**	**72.31**	**322.92**	**78.61**	**10.56**
Offsite Emissions						
Delivery Vehicles	39.16	2.89	11.02	2.95	2.11	0.04
Employee Vehicles	9.06	9.49	90.28	18.70	8.75	0.14
Subtotal of Offsite Emissions	**48.22**	**12.38**	**101.30**	**21.65**	**10.86**	**0.18**
Total Maximum Daily Emissions	**121.85**	**116.74**	**173.61**	**344.57**	**89.47**	**10.74**

Source: AECOM 2010a, Table E.3-9j (Palen DR Operating Emissions.xlsx), Galati & Blek 2010i, and staff estimate for employee vehicles and HTF fugitives.

Air Quality Table 9
PSPP Operations - Maximum Annual Emissions (tons/yr)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Operation Emissions						
Auxiliary Boilers	0.67	0.30	2.27	0.60	0.60	0.68
Emergency Fire Pump Engines	0.09	0.00	0.09	0.00	0.00	0.00
Emergency Generators	1.47	0.08	0.84	0.05	0.05	0.00
Auxiliary Cooling Towers	---	---	---	0.26	0.26	---
HTF Vents	---	0.30	---	---	---	---
HTF Fugitives	---	16.95	---	---	---	---
Onsite Maintenance Vehicles	0.10	0.01	0.07	31.32	6.64	0.00
Fuel Depot	--	0.004	--	--	--	--
Subtotal of Onsite Emissions	**2.33**	**17.74**	**3.27**	**32.23**	**7.55**	**0.68**
Offsite Emissions						
Delivery Vehicles	1.46	0.11	0.41	0.11	0.08	0.00
Employee Vehicles	1.65	1.73	16.48	3.41	1.60	0.02
Subtotal of Offsite Emissions	**3.11**	**1.84**	**16.89**	**3.52**	**1.68**	**0.022**
Total Maximum Annual Emissions	**5.44**	**19.48**	**20.16**	**35.75**	**9.23**	**0.70**

Source: AECOM 2010a, Table E.3-9g (Palen DR Operating Emissions.xlsx), Galati & Blek 2010i, and staff estimate for employee vehicles and HTF fugitives.

Project Construction and Operation Overlapping

This proposed project includes the construction of two separate power block units that would start operation at different periods as each completes construction. Construction would be scheduled to begin in late 2010 and continue through the fourth quarter of 2013. Commercial operation of Unit #1 is expected to begin in mid-2013, with commercial operation of Unit #2 following by the end of 2013. Although there would be an overlap of construction and operation emissions of approximately 6 months, this would not be the worst case scenario as maximum construction emissions occur much earlier during the construction schedule, so the maximum short term and annual construction period emissions are forecast to occur early enough in the construction period that they should not overlap with the operation of the Unit #1. Additionally, the operating emissions are

small in comparison to the construction emissions, so any overlap after the maximum construction period is assumed not to create a new maximum emissions scenario. Therefore, staff concludes that the overlapping emissions and impacts during this overlapping period would be no worse than the worst-case construction impacts and has not performed any additional impact assessment of the construction/operation overlapping period.

Initial Commissioning

Initial commissioning refers to a period prior to beginning commercial operation when the equipment undergoes initial tests. For this proposed project initial commissioning would occur at intervals during the construction period when each of the two power units become operational. Because of this proposed project's use of a non-fuel fired generating technology, staff does not expect major changes in emissions from the facility commissioning activities compared to that of normal operation.

Dispersion Modeling Assessment

While the emissions are the actual mass of pollutants emitted from the proposed project, the impacts are the concentration of pollutants from the proposed project that reach the ground level. When emissions are expelled at a high temperature and velocity through a relatively tall stack, the pollutants would be greatly diluted by the time they reach ground level. For this proposed project there are no very tall emission stacks, but the construction and maintenance vehicles and emergency engine do have high temperature and velocity exhausts; and the boilers also have relatively high exhaust temperatures and velocities. The emissions from the proposed project, both stationary source and onsite mobile source emissions, are analyzed through the use of air dispersion models to determine the probable impacts at ground level.

Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions to provide theoretical maximum offsite pollutant concentrations short-term (1-hour, 3-hour, 8-hour, and 24-hour) and annual periods. The model results are generally described as maximum concentrations, often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

The applicant used the U.S.EPA guideline ARMS/EPA Regulatory Model (AERMOD) model to estimate ambient impacts from project construction and operation. The construction emission sources for the site were grouped into two categories: equipment (off-road equipment); and vehicles (on-road equipment), where the exhaust and fugitive dust emissions for each type were calculated for particulate matter modeling. Emissions from onsite equipment engines and fugitive dust emission sources were modeled as area sources. Similar modeling procedures were used by the applicant to determine impacts from the operating maintenance vehicle exhaust and fugitive dust emissions, while the stationary sources (boilers, engines, cooling towers) were modeled as point sources.

The inputs for the air dispersion models include two power blocks with stack information (exhaust flow rate, temperature, and stack dimensions), specific engine and vehicle

emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this proposed project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the Blythe Airport meteorological station during 2002 through 2004.

For the determination of one-hour average and annual average construction NOx concentrations the Ozone Limiting Method (OLM) was used to determine worst-case near field NO_2 impacts. The NOx emissions from internal combustion sources, such as diesel engines, are primarily in the form of nitric oxide (NO) rather than NO_2. The NO converts into NO_2 in the atmosphere, primarily through the reaction with ambient ozone, and NOx OLM assumes full conversion of stack NO emission with the available ambient ozone. The NOx OLM method was used assuming an initial NO_2/NOx ratio of 0.1 for all NOx emission sources. Actual monitored hourly background ozone concentration data from Niland, California were used for all of 2002 and January through April of 2003, and Blythe monitoring data were used from May 2003 through 2004, based on data availability, to provide ozone data that corresponds with the years of meteorological data that were used to calculate maximum potential NO to NO_2 conversion to determine the maximum hourly NO_2 impacts.

The applicant has also provided a modeling analysis to show compliance during operation with the new federal 1-hour NO_2 standard (Galati & Blek 2010i). This modeling analysis, also using the AERMOD dispersion model, includes the use of the NOx_OLM modeling option and used a post-processor developed by the applicant's consultant to also add in the corresponding hourly NO_2 background data and determine the 98th percentile of daily maximums (eighth highest) for each modeled receptor location. The NOx_OLM option considers that the emissions of NOx are initially primarily in the form of NO that over time oxidizes, primarily through a reaction with ozone, to NO_2. The initial NO_2/NOx ratio was set at the default value of 0.1 and the conversion of the rest of the NO to NO_2 is assumed to be limited by the hourly ambient ozone concentration. For this modeling analysis the applicant obtained hourly monitored ozone and NO_2 concentration data, concurrent with the 2002 to 2004 meteorological data, from Niland (2002 part of 2003) and Blythe (part of 2003 and 2004) for ozone, and from Palm Springs for NO_2. While using ozone and NO_2 concentration data from the same source is preferred the remoteness of the site and limited number of stations made this a reasonable option, the use of the older ambient ozone and NO_2 background data is conservative as the ambient concentrations for both have dropping since 2002 to 2004.

Staff reviewed the background concentrations provided by the applicant, replacing them where appropriate[7] with the available highest ambient background concentrations from the last three years at the most representative monitoring stations as show in **Air Quality Table 5**. Staff added the modeled impacts to these background concentrations, and then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the proposed project's emission impacts would cause a new exceedance of an ambient air quality standard or would contribute to an existing exceedance.

[7] This does not include the background for the federal 1-hour NO_2 standard since the applicant's modeling analysis uses actual monitored NO_2 concentrations to determine the combined project plus background average 98th percentile 1-hour NO_2 impacts.

The following sections discuss the proposed project's short-term direct construction and operation ambient air quality impacts, as estimated by the applicant, and describes appropriate mitigation measures.

Construction Impacts and Mitigation

Construction Modeling Analysis

Using estimated peak hourly, daily and annual construction equipment exhaust emissions; the applicant modeled the proposed project's construction emissions to determine impacts (Solar Millennium 2010a). To determine the construction impacts on ambient standards (i.e. 1-hour through annual) it was assumed that the emissions would occur during a daily construction schedule of 10-hour days from March through September (7am to 5pm) and 8-hour days from October through February (8am to 4pm). The predicted proposed project pollutant concentration levels were added to conservatively worst-case maximum background concentration levels (**Air Quality Table 5**) to determine the cumulative effect. The results of the applicant's modeling analysis are presented in **Air Quality Table 10**. The construction emissions modeling analysis, including both the onsite fugitive dust and vehicle tailpipe emission sources (with applicant-proposed control measures) are summarized in **Air Quality Tables 6** and **7**.

Air Quality Table 10
Maximum Project Construction Impacts

Pollutants	Avg. Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr.	351.9	45.1[a]-	397.0	339	117%
	Annual	4.9	19.0	23.9	57	42%
CO	1-hr	575	2,645	3,220	23,000	14%
	8-hr	282	878	1,160	10,000	12%
PM10	24	51.9	83	134.9	50	270%
	Annual	3.9	30.5	34.1	20	171%
PM2.5	24	14.5	20.5	35.0	35	100%
	Annual	1.32	8.7	10.0	12	83%
SO_2	1-hr	1.71	23.6	25.3	665	4%
	3-hr	1.33	15.6	16.9	1,300	1%
	24-hr	0.42	13.1	13.5	105	13%
	Annual	0.01	3.5	3.5	80	4%

Source: Galati & Blek 2010i.
Note: [a] – This is the background concentration that corresponds with the hour with the highest combined matched hourly project impact and hourly monitored NO_2 background concentration.

This modeling analysis indicates, with the exception of PM10 and 1-hour NO_2, that the proposed project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. The conditions that would create worst-case project modeled impacts (low wind speeds) are not the same conditions when worst-case background is expected for PM10. Additionally, the worst-case PM10 impacts occur at the fence line and drop off quickly with distance from the fence line. In light of the existing PM10 non-attainment status for the project site area, staff considers the construction PM10 emissions to be potentially CEQA significant and recommends that the off-road equipment and fugitive dust PM10 emissions be mitigated pursuant to CEQA.

The applicant's modeling results indicate that 1-hour NO_2 concentrations above the state standard only occur within 200 meters of the north fence line at night. Staff believes that these results are conservative and over predict the impacts for project construction for the following reasons:

- The modeling analysis included the very conservative input assumptions of using area sources to model all of the construction NOx emissions, except for the concrete batch plant generator which was modeled as a point source and consequently found to have minimal NO_2 impacts (less than 3 µg/m3).
- Impacts exceeding the state standard only occurred for five out of the 26,304 hours modeled and were found to only occur at night when construction activities would normally be winding down or at much lower level of emissions than during mid-day.
- The modeling, which did incorporate the ozone limiting method (OLM), did not undergo further refinement to determine the actual expected maximum conversion of NO to NO_2 in the very short time period the emissions plume would take to get to and just past the fence line. OLM assumes immediate 100 percent conversion based on the available concentration of ozone. Staff is certain that such an analysis would show that the maximum NO_2 concentrations from construction would not exceed the state standard.

However, to be certain that there would be no risk to public health from construction NOx emissions, staff recommends that the off-road construction equipment be mitigated by requiring the use of equipment that meets the latest U.S. EPA and ARB engine emission standards.

Staff concludes with implementation of staff-proposed mitigation measures the construction impacts would not contribute substantially to exceedances of PM10 or ozone standards, nor cause new exceedances of the 1-hour state NO_2 standard.

The modeling analysis shows that, after implementation of the recommended emission mitigation measures, the proposed project's construction is not predicted to cause new exceedances of the NAAQS. Construction Mitigation

Applicant's Proposed Mitigation

To mitigate the impacts due to construction of the facility, the applicant has stipulated to staff's previously recommended construction mitigation measures **AQ-SC1** through **AQ-SC5** for other large solar projects (Solar Millennium 2009a, Section 5.2.5.1).

Adequacy of Proposed Mitigation

Staff generally concurs with the applicant's proposed stipulation to staff conditions **AQ-SC1** through **AQ-SC5**.

Staff Proposed Mitigation

Staff recommends the applicant's proposed construction mitigation be formalized, with minor modifications that update the measures to meet current staff recommendations, in staff Conditions of Certification **AQ-SC1** through **AQ-SC5**. Staff has determined that the proposed conditions of certification would mitigate all construction air quality impacts of the proposed project to less than significant levels pursuant to CEQA.

Staff has considered the minority population surrounding the site (see Socioeconomics Figure 1). Since the proposed project's direct air quality impacts have been reduced to less than significant, there is no environmental justice issue for air quality.

Operation Impacts and Mitigation

The following section discusses the proposed project's direct operating ambient air quality impacts, as estimated by the applicant and evaluated by staff. Additionally, this section discusses the recommended mitigation measures.

Operation Modeling Analysis

Using estimated peak hourly, daily and annual operating emissions, the applicant modeled the proposed project's operation emissions to determine impacts (Solar Millennium 2010a). The predicted proposed project pollutant concentration levels were added to conservatively estimated worst-case maximum background concentration levels (**Air Quality Table 5**) to determine the cumulative effect. **Air Quality Table 11** presents the results of the applicant's modeling analysis. The operation modeling analysis includes emissions from the stationary sources for both power blocks and the onsite fugitive dust and vehicle tailpipe emission sources estimated by the applicant, which all include the applicant's proposed control measures, and that are summarized in **Air Quality Tables 8** and **9**.

Air Quality Table 11
Project Operation Emission Impacts

Pollutants	Avg. Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr CAAQS	139.7	119	258.7	339	76%
	1-hr NAAQS	171.6	NA	171.6	188	91%
	Annual	0.03	19.0	19.0	57	33%
CO	1-hr	183.5	2,645	2,829	23,000	12%
	8-hr	73.9	878	952	10,000	10%
PM10	24	14.1	83	97.1	50	194%
	Annual	1.8	30.5	32.3	20	162%
PM2.5	24	2.5	20.5	23.0	35	66%
	Annual	0.39	8.7	9.1	12	76%
SO_2	1-hr	3.1	23.6	26.7	665	4%
	3-hr	2.1	15.6	17.7	1,300	1%
	24-hr	0.23	13.1	13.3	105	13%
	Annual	0.008	3.5	3.5	80	4%

Source: Galati & Blek 2010i .

This modeling analysis indicates, with the exception of PM10 impacts that the proposed project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. The conditions that would create worst-case project modeled impacts (low wind speeds) are not the same conditions when worst-case background is expected for PM10. Additionally, the worst-case PM10 impacts occur at the fence line and drop off quickly with distance from the fence line. Therefore, staff concludes that the operation impacts, when considering staff's mitigation measures would not contribute substantially to exceedances of the PM10 CAAQS.

However, in light of the existing PM10 and ozone non-attainment status for the project site area, staff considers the operation NOx, VOC, and PM emissions to be potentially CEQA significant and recommends that the off-road equipment and fugitive dust emissions be mitigated pursuant to CEQA.

The modeling analysis shows that, after implementation of the recommended emission mitigation measures, the proposed project's operation is not predicted to cause new exceedances of the NAAQS.

Operations Mitigation

Applicant's Proposed Mitigation

Emission Controls

As discussed in the air quality section of the AFC and Data Reponses (Solar Millennium 2009a, AECOM 2010a), the applicant proposes the following Best Available Control Technology (BACT) emission controls on the stationary equipment associated with the PSPP:

Auxiliary Boilers

The applicant has proposed one 35 MMBtu per hour auxiliary boiler per power plant unit, which would be fired on LPG, and would be equipped with ultra-low NOx burners. The daily operation of each boiler is limited to five hours per day at 25% load and 12 hours per day at full load. Annual operation of each boiler is limited to 5,100 hours per year with a duty cycle of 12% (600 hours per year) at full load and 88% (4,500 hours per year) at 25% load. The proposed boilers would have the following emission limits, each:

- NOx: 0.39 lb/hour (9 ppm @ 3% oxygen)
- CO: 1.31 lb/hour (50 ppm @ 3% oxygen)
- VOC: 0.18 lb/hour
- PM10/PM2.5: 0.35 lb/hour
- SO2: 0.40 lb/hour

Fire Water Pump Engines

The applicant has proposed one 300 bhp fire water pump engine per power plant unit, which would be fired on ARB diesel fuel. The applicant has proposed ARB/EPA Tier 3 engines, compliant with the New Source Performance Standards, Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, for the fire water pumps. The proposed ARB/EPA Tier 3 engines would have the following emission guarantees:

- NMHC + NOx: 3.0 gram/bhp-hour
- CO: 2.6 gram/bhp-hour
- PM10/PM2.5: 0.15 gram/bhp-hour
- SOx ARB diesel fuel (15 ppm sulfur)

Emergency Generators

The applicant has proposed one 2,922 brake horsepower (bhp) emergency generator engine per power plant unit, which would be fired on ARB diesel fuel. The applicant has

proposed ARB/EPA Tier 2 engines, compliant with the New Source Performance Standards, Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, for the emergency generators. The proposed ARB/EPA Tier 2 engines would have the following emission guarantees:

- NMHC + NOx: 4.8 gram/bhp-hour
- CO: 2.6 gram/bhp-hour
- PM10/PM2.5: 0.20 gram/bhp-hour
- SOx ARB diesel fuel (15 ppm sulfur)

Cooling Towers

The applicant has proposed one two-cell cooling tower per power plant unit, which is used for auxiliary equipment cooling. The cooling towers would each have a high efficiency drift eliminator guaranteed to control drift to 0.0005% of the water recirculation rate. Additionally, the cooling tower recirculating water would be controlled to a maximum total dissolved solids content of 2,000 ppm. The cooling towers would have the following emission limits, each:

- PM10/PM2.5: 0.03 lb/hour, 0.64 lb/day, 0.12 tons/year

HTF Expansion Tank Vents

The applicant has proposed one HTF ullage tank system for each of the two power block units. The HTF breaks down over time and these breakdown products need to be released to maintain the working composition of the HTF. The breakdown products are a mixture of higher and lower boiling organic compounds (VOC) that are vented in order to remove them from the HTF mixture. The VOC emissions would be controlled with two carbon canisters in series with an efficiency of 98%. VOC emissions would be limited to a maximum of 0.75 lb/hr after control, and the HTF ullage tank would be vented a maximum of two hours per day and 400 hours/year:

- VOC: 98% control efficiency (0.75 lb/hour, 1.50 lb/day, 0.15 tons/yr)

HTF Piping Systems

The HTF piping system is composed of a number of piping components (pump seals, valves, pressure relief vents, flanges, etc.). These components would leak hot HTF that would evaporate and cause VOC emissions. The applicant is proposing maintenance inspections and repair of the piping system to reduce HTF leaks.

Gasoline Tank

The gasoline tank would be required to have Phase 1 and Phase 2 vapor recovery controls that reduce emissions from tank filling and vehicle refueling.

Operation and Maintenance Vehicles

The applicant has stipulated to conditions recommended by staff on other recent large solar power projects to control maintenance vehicle emissions, which states the following vehicle requirements:

- The project owner will use gasoline powered light trucks, equivalent of the Ford F150 model, for facility maintenance, except for mirror washing, welding rigs, or other specific activities which require a larger vehicle;

- Only new trucks meeting California on-road vehicle emission standards will be purchased for use at the site; and
- The applicant has stipulated to staff's previously recommended fugitive dust control condition for operation that includes the same mitigation measures as required during construction, as appropriate.

Adequacy of Proposed Mitigation

Staff concurs with the District's preliminary determination that the proposed project's stationary source proposed emission controls/emission levels for criteria pollutants meet regulatory requirements and that the proposed stationary source emission levels are reduced adequately. However, the District does not require the HTF piping systems or the auxiliary cooling towers to be permitted as stationary sources, so staff has included conditions to formalize the applicant's stipulated VOC and PM10 mitigation measures, respectively, for these two emission sources.

Additionally, staff generally agrees that the applicant's proposed fugitive dust mitigation measures would provide adequate fugitive dust emission control.

Staff Proposed Mitigation

As mentioned earlier in the discussions of the ozone and PM10 impacts, staff concludes that the proposed project's direct stationary source ozone precursor and PM10 emissions are minimal, but when combined with the maintenance vehicles emissions could be significant. Additionally, staff believes that a solar renewable project, which would have a 30-year life in a setting likely to continue to be impacted by both local and upwind emission sources, should address its contribution to the potentially ongoing nonattainment of the PM10 and ozone standards. Staff concludes that the applicant's proposed mitigation measures, that mirror staff's current mitigation requirements for other large solar projects, would adequately mitigate the proposed project's stationary source, mobile equipment, and fugitive dust emissions. Therefore, staff recommends the operating mitigation be formalized, with minor modifications to meet current staff recommendations, in staff Conditions of Certification **AQ-SC6** and **AQ-SC7**.

Staff is also proposing Condition of Certification **AQ-SC8** to ensure that the Energy Commission license is amended as necessary to incorporate changes to the air quality permits.

Finally, staff is recommending two additional conditions, one each for the HTF piping systems and auxiliary cooling towers, two operating stationary emission sources that are not included in the SCAQMD permit. Proposed Condition of Certification **AQ-SC9** would require that an HTF piping component inspection and maintenance plan be prepared and followed to reduce leakage of HTF from the piping components[8]. Proposed Condition of Certification **AQ-SC10** would require that the proposed cooling towers have high efficiency mist eliminators and require the applicant to test and control recirculating water total dissolved solids content to reduce particulate emissions from the cooling towers.

[8] Please note that this condition will be revised in a supplement to address consistency with other solar projects now being licensed and the potential that the SCAQMD may add a condition for HTF piping component inspection and maintenance in its Final Determination of Compliance.

Staff has determined that the proposed emission controls and emission levels, along with the applicant proposed and staff recommended emission mitigation measures, would mitigate all proposed project air quality impacts to less than significant pursuant to CEQA.

Staff has considered the minority population surrounding the site (see **Socioeconomics Figure 1**). Since the proposed project's direct air quality impacts have been reduced to less than significant, there is no environmental justice issue for air quality.

Indirect Pollutant and Secondary Pollutant Impacts

The proposed project would have direct emissions of chemically reactive pollutants (NOx, SOx, and VOC), but would also have indirect emission reductions associated with the reduction of fossil fuel–fired power plant emissions due to the proposed project displacing the need for their operation, since solar renewable energy facilities would operate on a must-take basis.[9] However, the exact nature and location of such reductions is not known, so the discussion below focuses on the direct emissions from the proposed project within the Riverside County portion of the Mojave Desert Air Basin.

Ozone Impacts

There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the model to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, it can be said that the emissions of NOx and VOC from the PSPP do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts would be cumulatively significant under CEQA because they would contribute to ongoing violations of the state ozone ambient air quality standards.

PM2.5 Impacts

Secondary particulate formation, which is assumed to be 100% PM2.5, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first and then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely and irreversibly to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase would tend to fall out; however, the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air.

The emissions of NOx and SOx from PSPP do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region; however, the region is attainment for

[9] This refers to the fact that the contract between the owner of this solar power facility and the utility will require that the utility take all generation from this facility with little or no provisions for the utility to direct turn down of generation from the facility.

PM2.5 standards and the low level of NOx and SOx emissions from the proposed project would not significantly impact that status.

Impact Summary

The applicant is proposing to mitigate the proposed project's stationary source NOx, VOC, SO_2, and PM10/PM2.5 emissions through the use of Best Available Control Technology (BACT) and reduce the proposed project's mobile source emissions by using lower emitting new vehicles. With the applicant's stipulated vehicle emission mitigation, which is formalized in Staff Condition of Certification **AQ-SC6,** staff concludes that the proposed project would not cause significant secondary pollutant impacts.

C.1.4.3 CEQA LEVEL OF SIGNIFICANCE

Project Construction

Staff considers the unmitigated construction NOx, VOC, and PM emissions to be potentially CEQA significant and, therefore, staff is recommending that the NOx, VOC, and PM emission be mitigated pursuant to CEQA. Staff is recommending several mitigation measures (**AQ-SC1** through **AQ-SC5**), that also include the applicant's stipulated construction mitigation measures, to limit exhaust emissions and fugitive dust emissions during project construction to the extent feasible.

Therefore, while there would be adverse CEQA air quality impacts during construction, they are expected to be less than significant after implementation of the applicant's stipulated and staff's recommended mitigation measures.

Project Operation

Staff considers the unmitigated operation and maintenance NOx, VOC, and PM emissions to be potentially CEQA significant and, therefore, staff is recommending that the NOx, VOC, and PM emissions be mitigated pursuant to CEQA. Staff is recommending two mitigation measures (**AQ-SC6** and **AQ-SC7**), that also include the applicant's stipulated operations emission mitigation, to limit exhaust emissions and fugitive dust emissions during project operation to the extent feasible.

Therefore, while there would be adverse CEQA air quality impacts during operation, they are expected to be less than significant after implementation of the applicant's stipulated and staff's recommended mitigation measures.

Closure and Decommissioning

Eventually the facility would close, either at the end of its useful life or due to some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease to operate and thus impacts associated with those emissions would no longer occur. The only other expected emissions would be equipment exhaust and fugitive particulate emissions from the dismantling activities. These activities would be of a much shorter duration than construction of the proposed project, equipment are assumed to have much lower comparative emissions due to technology advancement, and fugitive dust emissions would be required to be controlled in a manner at least equivalent to that required

during construction. Therefore, while there would be adverse CEQA air quality impacts during decommissioning, they are expected to be less than significant.

C.1.5 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility that would reconfigure the proposed solar Unit #1 and #2 by changing their shapes as shown on **Alternatives Figure 1**. Proposed Unit #1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. This alternative would separate Unit #1 into two separate polygons trending southeast. Proposed Unit #2 (the western solar field) would remain in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. This alternative is analyzed because (1) it would retain the 500 MW generation capacity defined for the proposed project and the engineering is defined by the applicant as feasible, and (2) it reduces impacts to the primary and secondary desert washes that cross the proposed site; and (3) it would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

In addition to reconfiguring the Unit #1 and #2 solar fields, it would also modify the locations for the power blocks, water treatment system, water storage tanks, and the administration, control, warehouse, maintenance, and lab buildings. The Reconfigured Alternative is shown in **Alternatives Figure 1**.

C.1.5.1 SETTING AND EXISTING CONDITIONS

This alternative would reconfigure the layout of each unit, but the alternative would remain entirely within BLM managed lands. The setting and existing conditions for this alternative are the same as the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same air quality LORS.

C.1.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Reconfigured Alternative would require approximately the same amount of construction and would have the same operating equipment and nearly identical operating maintenance requirements. The applicant did not provide criteria pollutant emission estimates for the construction and operation of this alternative but staff assumes that the construction and operation emissions are approximately the same, or just slightly higher due to a less efficient site layout, as those for the proposed project. Therefore, the construction and operation emissions would be similar to those shown in **Air Quality Tables 6** and **7**, and **Air Quality Tables 8** and **9**, respectively.

The maximum daily and maximum annual construction and operation emissions and emission impacts for the Reconfigured Alternative are likely to be similar to those found for the proposed project, assuming the same maximum daily and annual construction activities. However, the amount of increase or reduction in impacts is uncertain as the worst case impacts are based on factors such as proximity to receptors and terrain as well as total emissions. Additionally, it is possible that the revised fence line shape reduces the distance from the primary operating emission sources to public areas

outside of the fence line. Considering the potentially significantly shortened distance to fence line and the corresponding potential increase in 1-hour NO_2 impacts from the engines, staff would recommend an additional NO_2 emissions mitigation measure **AQ-SC11** for this project alternative that requires the applicant to prove that they will not cause exceedances of the short term 1-hour NO_2 standards through modeling analysis or through the proposed use of Tier 4 Emergency Generator Engines (an approximate 90 percent reduction in proposed emissions from the dominant NO_2 impact source). With this additional recommended NOx emission mitigation measure staff believes that the worst-case short-term and annual construction and operation pollutant concentration impacts for this alternative would be no worse than those shown for the proposed project in **Air Quality Tables 10** and **11**, respectively.

The results of the Reconfigured Alternative would be the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would be the same as the proposed project and would require the same level of mitigation. The total construction period and total construction emissions and long-term ground level pollutant concentration impacts would be similar to those required to construct the proposed project.
- The operation emissions and ground level pollutant concentration impacts would be higher than those for the proposed project due to a change in the distance from the emergency generator to the fence line, which staff believes would require additional mitigation as provided in recommended Condition of Certification **AQ-SC11** in order to reduce NOx emission impacts and ensure impacts from this alternative due not cause new ambient air quality standard exceedances. Otherwise, this alternative is essentially identical to the proposed project and requires the same level of mitigation as the proposed project to mitigate other potential impacts. This alternative would provide the same benefits of the proposed project in displacing fossil fuel–fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions.

C.1.5.3 CEQA LEVEL OF SIGNIFICANCE

The level of significance under CEQA for the Reconfigured Alternative would, with staff's additional recommended Condition of Certification **AQ-SC11** to mitigate potential 1-hour NO_2 impacts, remain less than significant. Otherwise, the significance findings are the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant NOx and PM emission impacts during the Reconfigured Alternative construction and operation. The staff recommended mitigation that would be proposed for Reconfigured Alternative would include all of the measures that are proposed for the proposed project (staff recommended conditions **AQ-SC1** to **AQ-SC10**), the additional staff condition **AQ-SC11**, and the SCAQMD proposed Conditions of Certification **AQ-1** through **AQ-23**.

C.1.6 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be approximately 25% smaller, occupying about 2080 acres of land (as compared with 2,740 acres required for the proposed project).

The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**. The Reduce Acreage Alternative would result in an approximately 375 MW project, which is 75% of the proposed project's generating capacity. This alternative is analyzed for several reasons: (1) it would eliminate about 25% of the proposed project area so all impacts would be reduced; (2) it would reduce impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley aeolian sand corridor, and the Mojave Fringe-Toed Lizard by prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields; (3) it would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 2; and (4) it would reduce impacts to primary and secondary desert washes crossing the proposed site. The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**.

C.1.6.1 SETTING AND EXISTING CONDITIONS

The Reduced Acreage Alternative would modify the boundaries of Units #1 and #2 but would not significantly move the project. The transmission lines, road access, and gas pipeline requirement would remain approximately the same length as for the proposed project. The linear construction would require minor adjustments to accommodate the modified layout.

The setting and existing conditions for this alternative are the same as the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same air quality LORS.

C.1.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Reduced Acreage Alternative would reduce the total construction emissions of the proposed project by somewhat less than 25%, and operation emissions of the proposed project (see **Air Quality Tables 8** and **9**) by somewhat less than 25%, due to reduced efficiencies of the smaller project. However, the maximum daily and annual construction emissions are assumed to be similar to the proposed project assuming the same level of maximum activity with a reduction in the overall construction schedule. Therefore, the maximum construction emissions would be approximately the same as the emissions shown in **Air Quality Tables 6** and **7**.

The maximum short-term and maximum annual construction pollutant concentration impacts for the Reduced Acreage Alternative are assumed to be essentially the same as that estimated for the proposed project, assuming the same maximum daily and annual construction activities. Therefore, the worst-case short-term and annual construction pollutant concentration impacts for this alternative are assumed to be essentially the same as those shown for the proposed project in **Air Quality Table 10**.

The maximum annual operation pollutant concentration impacts for the Reduced Acreage Alternative are likely to be similar to those found for the proposed project as shown in **Air Quality Table 11**. However, the amount of increase or reduction in impacts is uncertain as the worst case impacts are based on factors such as proximity to receptors and terrain as well as total emissions. Additionally, it is possible that the revised fence line shape reduces the distance from the primary operating emission

sources to public areas outside of the fence line. Considering the potentially significantly shortened distance to fence line and the corresponding potential increase in 1-hour NO_2 impacts from the engines, staff would recommend an additional NO_2 emissions mitigation measure **AQ-SC11** for this project alternative that requires the applicant to prove that they will not cause exceedances of the short term 1-hour NO_2 standards through modeling analysis or through the proposed use of Tier 4 Emergency Generator Engines (an approximate 90 percent reduction in proposed emissions from the dominant NO_2 impact source). With this additional recommended NOx emission mitigation measure staff believes that the worst-case short-term and annual construction and operation pollutant concentration impacts for this alternative would be no worse than those shown for the proposed project in **Air Quality Tables 10** and **11**, respectively.

The results of the Reduced Acreage Alternative would be the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would be similar to the proposed project and would require the same level of mitigation. The total construction period and total construction emissions would be reduced from those required to construct the proposed project.
- The operation emissions and ground level pollutant concentration impacts would be higher than those for the proposed project due to a change in the distance from the emergency generator to the fence line, which staff believes requires additional mitigation as provided in recommended Condition of Certification **AQ-SC11** in order to reduce NOx emission impacts and ensure impacts from this alternative do not cause new ambient air quality standard exceedances. Otherwise, this alternative is essentially identical to the proposed project and requires the same level of mitigation as the proposed project to mitigate other potential impacts.
- The benefits of the proposed project in displacing fossil fuel–fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions would be slightly reduced.

If the Reduced Acreage Alternative were approved, other renewable projects may be developed on other sites in the in the SCAQMD, the MDAB, or in adjacent states to fill the 125 MW gap not supplied by the proposed project as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates.[10]

C.1.6.3 CEQA LEVEL OF SIGNIFICANCE

The level of significance under CEQA for the Reduced Acreage Alternative, with staff's additional recommended Condition of Certification **AQ-SC11** to mitigate potential 1-hour NO_2 impacts, would remain less than significant. Otherwise, the significance findings are the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant NOx and PM emission impacts during the Reduced Acreage Alternative construction and operation. The staff recommended mitigation that would be proposed for Reduced Acreage Alternative would include all of the measures that are proposed for the proposed project (staff recommended conditions

[10] Such as the State of California 33% Renewable Portfolio Standard (RPS) mandated under Executive Order S-14-08.

AQ-SC1 to **AQ-SC10**), the additional staff condition **AQ-SC11**, and the SCAQMD proposed Conditions of Certification **AQ-1** through **AQ-23**.

C.1.7 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres (Solar Millennium 2010l).

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.1.7.1 SETTING AND EXISTING CONDITIONS

This alternative would reconfigure the layout of Unit 1. Unit 2 would remain as for the proposed project. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant. The setting and existing conditions for this alternative are the same as the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same air quality LORS.

C.1.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Reconfigured Alternative #2 would require approximately the same amount of construction and would have the same operating equipment and nearly identical operating maintenance requirements. The applicant did not provide criteria pollutant emission estimates for the construction and operation of this alternative but staff assumes that the construction and operation emissions are approximately the same, or just slightly higher due to a less efficient site layout, as those for the proposed project. Therefore, the construction and operation emissions would be similar to those shown in **Air Quality Tables 6** and **7**, and **Air Quality Tables 8** and **9**, respectively.

The maximum daily and maximum annual construction and operation emissions and emission impacts for Reconfigured Alternative #2 are likely to be as high as that estimated for the proposed project, assuming the same maximum daily and annual construction activities. The Reconfigured Alternative #2 Unit 1 power block would be located approximately 2,700 feet (0.5 miles) south of the location for the proposed project. This revised location moves more of the solar field closer to the I-10, and so

would increase concerns regarding any visible fugitive dust plumes; however, staff believes appropriate measures are already in place to mitigate the potential for significant dust plumes that could impact the I-10 during construction and operation.

Additionally, the revised fence line shape reduces the distance from the primary operating emission sources to public areas outside of the fence line. The applicant provided responses (Solar Millennium 2010n) to staff data requests regarding how the layout will impact worst-case operating impacts that indicated: 1) SCAQMD does not require ambient impact analysis modeling for this project so revised modeling is not required for SCAQMD permitting purposes; and 2) the applicant believes that the worst-case impacts would not be substantially different for this reconfigured alternative since impacts are predominately from the modeled maintenance equipment. Staff's review of the modeling analysis shows that this assertion is generally accurate for the pollutants of concern, with the exception of the 1-hour NO_2 impacts that are predominately due to the large emergency engines. Considering the significantly shortened distance to fence line (from 3,914 to 2,388 feet) and the potential increase in 1-hour NO_2 impacts from the engines, staff recommends an additional NO_2 emissions mitigation measure **AQ-SC11** for this project alternative that requires the applicant to prove that they will not cause exceedances of the short term 1-hour NO_2 standards through modeling analysis or through the proposed use of Tier 4 Emergency Generator Engines (an approximate 90 percent reduction in proposed emissions from the dominant NO_2 impact source). With this additional recommended NOx emission mitigation measure staff believes that the worst-case short-term and annual construction and operation pollutant concentration impacts for this alternative would be no worse than those shown for the proposed project in **Air Quality Tables 10** and **11**, respectively.

The results of Reconfigured Alternative #2 would be the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would be the same as the proposed project and would require the same level of mitigation. The total construction period and total construction emissions and long-term ground level pollutant concentration impacts would be similar to those required to construct the proposed project.
- The operation emissions and ground level pollutant concentration impacts would be higher than those for the proposed project due to a change in the distance from the emergency generator to the fence line, which staff believes requires additional mitigation as provided in recommended Condition of Certification **AQ-SC11** in order to reduce NOx emission impacts and ensure impacts from this alternative due not cause new ambient air quality standard exceedances. Otherwise, this alternative is essentially identical to the proposed project and requires the same level of mitigation as the proposed project to mitigate other potential impacts.
- This alternative would provide the same benefits of the proposed project in displacing fossil fuel–fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions.

C.1.7.3 CEQA LEVEL OF SIGNIFICANCE

The level of significance under CEQA for Reconfigured Alternative #2, with staff's additional recommended Condition of Certification **AQ-SC11** to mitigate potential 1-hour

NO_2 impacts, would remain less than significant. Otherwise, the significance findings are the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant NOx and PM emission impacts during the Reconfigured Alternative #2's construction and operation. The staff recommended mitigation that would be proposed for Reconfigured Alternative #2 would include all of the measures that are proposed for the proposed project (staff recommended conditions **AQ-SC1** to **AQ-SC10**), the additional staff condition **AQ-SC11**, and the SCAQMD proposed Conditions of Certification **AQ-1** through **AQ-23**.

C.1.8 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres (Solar Millennium 2010l).

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.1.8.1 SETTING AND EXISTING CONDITIONS

This alternative would reconfigure the layout of Unit 1. Unit 2 would remain as for the proposed project. This reconfigured eastern solar field would be located primarily on public land managed by BLM; however, as with the proposed project, it includes a 40 acre private parcel on which the applicant has a purchase option. The setting and existing conditions for this alternative are the same as the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same air quality LORS.

C.1.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Reconfigured Alternative #3 would require approximately the same amount of construction and would have the same operating equipment and nearly identical operating maintenance requirements. The applicant did not provide criteria pollutant emission estimates for the construction and operation of this alternative but staff assumes that the construction and operation emissions are approximately the same, or just slightly higher due to a less efficient site layout, as those for the proposed project. Therefore, the construction and operation emissions would be similar to those shown in **Air Quality Tables 6** and **7**, and **Air Quality Tables 8** and **9**, respectively.

The maximum daily and maximum annual construction and operation emissions and emission impacts for Reconfigured Alternative #3 are likely to be as high as that estimated for the proposed project, assuming the same maximum daily and annual construction activities. The Reconfigured Alternative #2 Unit 1 power block would be located approximately 2,700 feet (0.5 miles) south of the location for the proposed project. This revised location, similar to Reconfigured Alternative #2, moves more of the solar field closer to the I-10, and so would increase concerns regarding any visible fugitive dust plumes; however, staff believes appropriate measures are already in place to mitigate the potential for significant dust plumes that could impact the I-10 during construction and operation.

Additionally, the revised fence line shape reduces the distance from the primary operating emission sources to public areas outside of the fence line. The applicant provided responses (Solar Millennium 2010n) to staff data requests regarding how the layout will impact worst-case operating impacts that indicated: 1) SCAQMD does not require ambient impact analysis modeling for this project so revised modeling is not required for SCAQMD permitting purposes; and 2) the applicant believes that the worst-case impacts would not be substantially different for this reconfigured alternative since impacts are predominately from the modeled maintenance equipment. Staff's review of the modeling analysis shows that this assertion is generally accurate for the pollutants of concern, with the exception of the 1-hour NO_2 impacts that are predominately due to the large emergency engines. Considering the significantly shortened distance to fence line (from 3,914 to 1,384 feet) and the potential increase in 1-hour NO_2 impacts from the engines, staff recommends an additional NO_2 emissions mitigation measure AQ-SC11 for this project alternative that requires the applicant to prove that they will not cause exceedances of the short term 1-hour NO_2 standards through modeling analysis or through the proposed use of Tier 4 Emergency Generator Engines (an approximate 90 percent reduction in proposed emissions from the dominant NO_2 impact source). With this additional recommended NOx emission mitigation measure staff believes that the worst-case short-term and annual construction and operation pollutant concentration impacts for this alternative would be no worse than those shown for the proposed project in **Air Quality Tables 10** and **11**, respectively.

The results of Reconfigured Alternative #3 would be the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would be the same as the proposed project and would require the same level of mitigation. The total construction period and total construction emissions and long-term ground level pollutant concentration impacts would be similar to those required to construct the proposed project.
- The operation emissions and ground level pollutant concentration impacts would be higher than those for the proposed project due to a change in the distance from the emergency generator to the fence line, which staff believes requires additional mitigation as provided in recommended Condition of Certification **AQ-SC11** in order to reduce NOx emission impacts and ensure impacts from this alternative due not cause new ambient air quality standard exceedances. Otherwise, this alternative is essentially identical to the proposed project and requires the same level of mitigation as the proposed project to mitigate other potential impacts.

- This alternative would provide the same benefits of the proposed project in displacing fossil fuel–fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions.

C.1.8.3 CEQA LEVEL OF SIGNIFICANCE

The level of significance under CEQA for Reconfigured Alternative #2, with staff's additional recommended Condition of Certification **AQ-SC11** to mitigate potential 1-hour NO_2 impacts, would remain less than significant. Otherwise, the significance findings are the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant NOx and PM emission impacts during the Reconfigured Alternative #2's construction and operation. The staff recommended mitigation that would be proposed for Reconfigured Alternative #2 would include all of the measures that are proposed for the proposed project (staff recommended conditions **AQ-SC1** to **AQ-SC10**), the additional staff condition **AQ-SC11**, and the SCAQMD proposed Conditions of Certification **AQ-1** through **AQ-23**.

C.1.9 NO ACTION ALTERNATIVES

C.1.9.1 NO ACTION ON PROPOSED PROJECT APPLICATION AND ON CDCA LAND USE PLAN AMENDMENT

Under this alternative, the proposed PSPP would not be approved by the CEC and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

The results of the No Project / No Action Alternative would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another renewable energy project.
- The benefits of the proposed project in reducing fossil fuel use and greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation (see **Appendix Air-1 – Greenhouse Gas Emissions** for details).

If the proposed project is not approved, renewable projects would likely be developed on other sites in the SCAQMD, the MDAB, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, as shown on **Cumulative Impacts Figure 1** and in **Table 1**, several dozen solar and wind development applications for use of BLM land have been submitted for approximately one million acres of the California Desert Conservation Area. Additional BLM land in Nevada and Arizona also has applications for solar and wind projects.

C.1.9.2 NO ACTION ON PROPOSED PROJECT AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA AVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed PSPP would not be approved by the CEC and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, air pollutant emissions and impacts would result from the construction and operation of the solar technology and would likely be similar to the air quality impacts from the proposed project. Different solar technologies require different amounts of construction and operations maintenance; however, the benefits of the proposed project in displacing fossil fuel–fired generation and reducing associated pollutant emissions could occur with a different solar technology at this site and therefore with this alternative. As such, this No Project/No Action Alternative could result in air quality impacts and benefits similar to the impacts under the proposed project.

C.1.9.3 NO ACTION ON PROPOSED PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA UNAVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed PSPP would not be approved by the CEC and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the air quality of the site is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in air quality impacts under the proposed project nor would it result in the air quality benefits from the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.1.10 PROJECT-RELATED FUTURE ACTIONS – AIR QUALITY

In order to transmit the power generated at the PSPP to the electricity grid, a new substation is required. Southern California Edison Company (SCE) will construct and operate the substation, which will allow the electricity to be carried by the Devers-Palo Verde No. 1 (DPV1) 500 kV transmission line.

The SCE Red Bluff Substation is a reasonably foreseeable project if the PSPP is approved and constructed as proposed. Therefore, this section examines the potential

impacts of the construction and operation of the proposed substation. This substation would allow interconnection of the PSPP and other renewable projects in the Desert Center area.

The SCE Red Bluff Substation project will be fully evaluated in a future EIS prepared by the BLM. Because detailed design information is not yet available for the Red Bluff Substation, the impact analysis presented here is based on available information. The purpose of this analysis is to inform the Energy Commission and BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the PSPP.

The project components and construction activities associated with this substation are described in Section B.3 of this RSA, and a map of its location is presented as **Figure B.3-1**. This analysis examines the construction and operation impacts of a 230/500 kV substation that would be located on approximately 90 acres, south of Interstate 10 and southeast of Desert Center. Substation components will include 230 kV and 500 kV lines, 230/ 500 kV transformer banks, associated switchracks, and a microwave tower. Additionally, a diesel-fueled emergency power generator may be required at the substation site. The substation would be located in an existing CDCA utility corridor, north of and adjacent to the existing DPV1 500 kV transmission line.

C.1.10.1 ENVIRONMENTAL SETTING

The SCE 230/500 kV Red Bluff Substation would be constructed in eastern Riverside County. The substation would be located on federal land managed by the BLM. The land use in this area is largely open space, recreation, and some private development north of the I-10 in the Desert Center region. As with the PSPP site, the proposed Red Bluff Substation site would be located within the Mojave Desert Air Basin (MDAB), in an area administered by the South Coast Air Quality Management District (SCAQMD). The Riverside County Portion of the MDAB is nonattainment for the State ozone and PM10 standards. Additional information regarding the MDAB and SCAQMD, including meteorological data, and ambient air quality data, can be found in the environmental setting section C.1.4.1 above.

C.1.10.2 ENVIRONMENTAL IMPACTS

The grading and construction activities required for the project would generate emissions at the locations of the work at the substation site. The project site emissions would principally consist of exhaust emissions from heavy-duty diesel and gasoline-powered construction equipment and particulate matter (fugitive dust) from construction activities (dozing, grading, excavation, etc.) and travel on unpaved surfaces. Beyond the boundaries of the substation site, exhaust emissions and paved unpaved road fugitive dust emissions would also be caused by workers commuting to and from the work sites, from trucks hauling concrete, transformers, conductor, structural building materials, and other equipment and supplies to the sites, and crew trucks (e.g., derrick trucks, bucket trucks, pickups).

Construction would include approximately 4 miles of improved access roads to reach the Red Bluff Substation and construction of a new 230/500 kV substation on approximately 90 acres.

Once construction is complete, operation emissions would result from vehicle use for periodic maintenance, repair, and inspection of the system components; and periodic testing of the emergency power generator. These mobile and stationary source emissions would be the only direct source of criteria pollutant emissions related to project operation, and they would be minor. System monitoring, control, and inspections would induce light and medium-heavy duty truck traffic. The air quality impact caused by emissions from project vehicular traffic for maintenance activities would be less than significant.

C.1.10.3 MITIGATION

Construction phase emissions are generally short-term in duration. Effective and comprehensive control measures would be needed to reduce equipment emissions to the extent feasible. Implementing appropriate fugitive dust control measures, such as those described in staff recommended conditions **AC-SC3** and **AC-SC4** would substantially reduce potential fugitive dust emissions during project construction. Implementing appropriate off-road equipment emission control measures, such as those described in **AC-SC5** would substantially reduce potential off-road equipment tailpipe emissions potential during project construction.

The project would be required to comply with South Coast Air Quality Management District rules and District/ARB portable equipment rules, which would dictate how certain equipment could be operated during construction and would dictate the emergency power generator engine control and testing requirements.

Staff concludes that with effective and comprehensive control measures such as those recommended for the proposed PSPP, fugitive dust and equipment exhaust criteria pollutant emission impacts could likely be reduced to a less than significant level.

C.1.10.4 CONCLUSION

The construction activities associated with SCE's proposed Red Bluff Substation would cause emissions due to heavy-duty diesel and gasoline-powered construction equipment and particulate matter (fugitive dust) emissions from construction activities and travel on paved and unpaved surfaces. With effective and comprehensive control measures such as those recommended for the proposed PSPP, dust and equipment exhaust CEQA impacts could likely be reduced to a less than significant level.

C.1.11 CUMULATIVE IMPACTS

Cumulative impacts are defined by CEQA 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.

This analysis is concerned with criteria air pollutants. Such pollutants have impacts that are usually (though not always) cumulative by nature. Rarely would a project by itself cause a violation of a federal or state criteria pollutant standard. However, a new source of pollution may contribute to violations of criteria pollutant standards because of the existing background sources or foreseeable future projects. Air districts attempt to attain the criteria pollutant standards by adopting attainment plans, which comprise a multi-faceted programmatic approach to such attainment. Depending on the air district, these plans typically include requirements for air offsets and the use of Best Available Control Technology (BACT) for new sources of emissions, and restrictions of emissions from existing sources of air pollution.

Thus, much of the preceding discussion is concerned with cumulative impacts. The "Existing Ambient Air Quality" subsection describes the air quality background in the Riverside County portion of the Mojave Desert Air Basin, including a discussion of historical ambient levels for each of the significant criteria pollutants. The "Construction Impacts and Mitigation" subsection discusses the proposed project's contribution to the local existing background caused by project construction. The "Operation Impacts and Mitigation" subsection discusses the proposed project's contribution to the local existing background caused by project operation. The following subsection includes two additional analyses:

- a summary of projections for criteria pollutants by the air district and the air district's programmatic efforts to abate such pollution; and
- an analysis of the proposed project's *localized cumulative impacts*, the proposed project's direct operating emissions combined with other local major emission sources.

C.1.11.1 SUMMARY OF PROJECTIONS

The SCAQMD is the agency with principal responsibility for air quality attainment planning in the portion of the MDAB surrounding the project site. The project site area is attainment for all federal air quality standards, so for the MDAB portion of SCAQMD's jurisdiction there are no federal planning requirements. However, this area is also non-attainment for state ozone and PM10 standards, where there are state planning requirements for ozone, but not PM10, attainment. SCAQMD has adopted two recent Air Quality Management Plans. These adopted air quality plans are summarized below.

- **2007 Air Quality Management Plan** (adopted 6/1/2007, not yet approved by U.S.EPA)

Link: www.aqmd.gov/aqmp/07aqmp/index.html

- **Final 2003 Air Quality Management Plan** (originally adopted 12/10/1999, amended in 2003, partially approved/partially disapproved by U.S.EPA in 2009.)

Link: www.aqmd.gov/aqmp/AQMD03AQMP.htm

These two plans extensively cover the attainment planning requirements for the South Coast Air Basin, and provide a separate chapter covering attainment planning for the portion of the Salton Sea Air Basin within SCAQMD jurisdiction. However, these plans do not mention any specific state ozone attainment planning requirements for the

portion of the MDAB within SCAQMD jurisdiction. PM10 attainment planning documents are not required by the state.

2007 Air Quality Management Plan

The Final 2007 AQMP control measures consist of four components: 1) the District's Stationary and Mobile Source Control Measures; 2) CARB's Proposed State Strategy; 3) District Staff's Proposed Policy Options to Supplement CARB's Control Strategy; and 4) Regional Transportation Strategy and Control Measures provided by SCAG. None of the specified control measures directly impact PSPP emission sources beyond existing regulations and permit requirements.

2003 Air Quality Management Plan

The SCAQMD amended the 1997 Air Quality Management Plan (AQMP) in 1999 to address the U.S. EPA's proposed disapproval of the 1997 Ozone SIP revision to ensure that the 1997 AQMP complied with or exceeded federal requirements. The 1999 AQMP amendments to the 1997 AQMP were subsequently approved by the U.S. EPA into the SIP in April 2000. The SCAQMD updated the PM10 portion of the 1997 AQMP for both the South Coast Air Basin and Coachella Valley in 2002 as part of the District's request to extend the PM10 attainment date from 2001 to 2006 for these areas as allowed under the federal Clean Air Act (CAA). The U.S. EPA approved the 2002 update on April 18, 2003.

The purpose of the 2003 Revision to the Air Quality Management Plan for the South Coast Air Basin (Basin) and those portions of the Salton Sea Air Basin under SCAQMD jurisdiction is to set forth a comprehensive program that will lead these areas into compliance with all federal and state air quality planning requirements. Specifically, the 2003 AQMP Revision is designed to satisfy the California Clean Air Act (CCAA) triennial update requirements and fulfill the District's commitment to update transportation emission budgets based on the latest approved motor vehicle emissions model and planning assumptions. The Plan will be submitted to U.S. EPA as a SIP revision once it is approved by the SCAQMD Governing Board and the California Air Resources Board (CARB).

The control measures specified in the 2003 AQMP are similar to those specified in the 2007 AQMP. Again, the specified control measures do not directly impact PSPP emission sources beyond the existing SCAQMD regulations and permit requirements.

Summary of Conformance with Applicable Air Quality Plans

The applicable air quality plans do not outline any new control measures applicable to the proposed project's operating emission sources. Therefore, compliance with existing District rules and regulations would ensure compliance with those air quality plans.

C.1.11.2 LOCALIZED CUMULATIVE IMPACTS

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see the "Operation Modeling Analysis" subsection) the proposed project's contributions to localized cumulative impacts can be estimated. To represent *past* and, to an extent, *present projects* that contribute to ambient air quality conditions, the Energy Commission staff recommends the use of ambient air quality monitoring data (see the "Existing Ambient Air Quality" subsection), referred to as the *background*.

The staff takes the following steps to estimate what are additional appropriate "present projects" that are not represented in the background and "reasonably foreseeable projects":

- First, the Energy Commission staff (or the applicant) works with the air district to identify all projects that have submitted, within the last year of monitoring data, new applications for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO within 6 miles of the project site. Based on staff's modeling experience, beyond 6 miles there is no statistically significant concentration overlap for non-reactive pollutant concentrations between two stationary emission sources.
- Second, the Energy Commission staff (or the applicant) works with the air district and local counties to identify any new area sources within 6 miles of the project site. As opposed to point sources, area sources include sources like agricultural fields, residential developments or other such sources that do not have a distinct point of emission. New area sources are typically identified through draft or final Environmental Impact Reports (EIRs) that are prepared for those sources. The initiation of the EIR process is a reasonable basis on which to determine what is "reasonably foreseeable" for new area sources.
- The data submitted, or generated from the applications with the air district for point sources or initiating the EIR process for area sources, provides enough information to include these new emission sources in air dispersion modeling. Thus, the next step is to review the available EIR(s) and permit application(s), determine what sources must be modeled and how they must be modeled.
- Sources that are not new, but may not be represented in ambient air quality monitoring are also identified and included in the analysis. These sources include existing sources that are co-located with or adjacent to the proposed source (such as an existing power plant). In most cases, the ambient air quality measurements are not recorded close to the proposed project, thus a local major source might not be well represented by the background air monitoring. When these sources are included, it is typically a result of there being an existing source on the project site and the ambient air quality monitoring station being more than 2 miles away.
- The modeling results must be carefully interpreted so that they are not skewed towards a single source, in high impact areas near that source's fence line. It is not truly a cumulative impact of PSPP if the high impact area is the result of high fence line concentrations from another stationary source and PSPP is not providing a substantial contribution to the determined high impact area.

Once the modeling results are interpreted, they are added to the background ambient air quality monitoring data and thus the modeling portion of the cumulative assessment is complete. Due to the use of air dispersion modeling programs in staff's cumulative impacts analysis, the applicant must submit a modeling protocol, based on information requirements for an application, prior to beginning the investigation of the sources to be modeled in the cumulative analysis. The modeling protocol is typically reviewed, commented on, and eventually approved in the Data Adequacy phase of the licensing procedure. Staff typically assists the applicant in finding sources (as described above), characterizing those sources, and interpreting the results of the modeling. However, the

actual modeling runs are usually left to the applicant to complete. There are several reasons for this: modeling analyses take time to perform and require significant expertise, the applicant has already performed a modeling analysis of the proposed project alone (see the "Operation Modeling Analysis" subsection), and the applicant can act on its own to reduce stipulated emission rates and/or increase emission control requirements as the results warrant. Once the cumulative project emission impacts are determined, the necessity to mitigate the proposed project emissions can be evaluated, and the mitigation itself can be proposed by staff and/or the applicant (see the "Operation Mitigation" subsection).

The applicant, in consultation with SCAQMD, confirmed that there are no projects within a 6-mile radius of the PSPP site that are under construction or have received permits to be built or operate in the foreseeable future. Therefore, it has been determined that no stationary sources requiring a cumulative modeling analysis exist within a 6-mile radius of the proposed project site. However, there are several pending solar and wind projects in the I-10 corridor area between Desert Center and Blythe including two thermal solar projects, the Blythe Solar Power Project and Genesis Solar Energy Project siting cases, which are currently being evaluated by the Energy Commission and BLM. This potential for significant additional development within the air basin and corresponding increase in air basin emissions is a major part of staff's rationale for recommending Conditions of Certification **AQ-SC6** and **AQ-SC7** that are designed to mitigate the proposed project's cumulative impacts by reducing the dedicated on-site vehicle emissions and fugitive dust emissions during site operation. With these recommended CEQA-only mitigation measures, staff has concluded that the CEQA cumulative air quality impacts are less than significant.

Staff has considered the minority population surrounding the site (see **Socioeconomics Figure 1**). Since the proposed project's cumulative air quality impacts have been mitigated to less than significant, there is no environmental justice issue for air quality.

C.1.12 COMPLIANCE WITH LORS

The South Coast Air Quality Management District (SCAQMD or District) issued a Preliminary Determination of Compliance (PDOC) for the PSPP on March 5, 2010 (SCAQMD 2010a), and later provided public notice with a 30 day comment period starting on April 15, 2010. The District will issue a Final Determination of Compliance (FDOC) after resolving issues raised by the public and agency comments. Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the PDOC. The District's PDOC conditions are presented in the Conditions of Certification (**AQ-1** to **AQ-23**).

Staff submitted an official PDOC comment letter on March 24, 2010 (CEC 2010b) and expects that the FDOC will contain revisions to conditions due to Energy Commission, applicant, or third party comments, and staff will provide the revised FDOC findings or conditions of certification in a supplement after receipt of the FDOC.

C.1.12.1 FEDERAL

The District is responsible for issuing the federal New Source Review (NSR) permit and has been delegated enforcement of the applicable New Source Performance Standard (Subparts Dc and IIII). However, this proposed project does not require a federal NSR or Title V permit and this proposed project would not require a PSD permit from U.S.EPA prior to initiating construction.

The proposed project requires the approval of a federal agency (BLM), but is located in an area that is in attainment or unclassified with all federal ambient air quality standards. Therefore, the proposed project is not subject to the general conformity regulations (40 CFR Part 93).

C.1.12.2 STATE

The project owner will demonstrate that the proposed project will comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury, with the issuance of the District's Final Determination of Compliance and the Energy Commission's affirmative finding for the project.

The emergency generator and fire water pump engines are also subject to the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines. This measure limits the types of fuels allowed, establishes maximum emission rates, and establishes recordkeeping requirements. The proposed Tier 2 emergency engine and Tier 3 fire water pump engine meet the current emission limit requirements of this measure. This measure would also limit the engines' testing and maintenance operation to no more than 50 hours per year.

C.1.12.3 LOCAL

The District rules and regulations specify the emissions control and offset requirements for new sources such as the PSPP. Best Available Control Technology would be implemented, and emission reduction credits (ERCs) are not required to offset the proposed project's emissions by District rules and regulations based on the permitted stationary source emission levels for the proposed project. Compliance with the District's new source requirements would ensure that the proposed project would be consistent with the strategies and future emissions anticipated under the District's air quality attainment and maintenance plans.

The applicant provided an air quality permit application to the SCAQMD and the District issued a PDOC on March 5, 2010 (SCAQMD 2010a). The PDOC states that the proposed project is expected to comply with all applicable District rules and regulations. The DOC evaluates whether and under what conditions the proposed project would comply with the District's applicable rules and regulations, as described below.

Regulation II – Permits

Rules 201, 203, and 212 – Permit to Construct, Permit to Operate, and Standards for Approving Permits and Issuing Public Notice

Rule 201 establishes the emission source requirements that must be met to obtain a Permit to Construct. Rule 203 prohibits use of any equipment the use of which may

emits air contaminants without obtaining Permit to Operate. The applicant has complied with these two rules by submitting the AFC and District permit applications materials.

Rule 212 requires that emissions sources be designed, controlled, or equipped with air pollution control equipment so that the equipment would not emit air contaminants in violation of Division 26 of the State Health and Safety Code or District Rules. This rule also requires notification to addresses located nearby the project (1/4 mile or as determined appropriate by the Executive Officer) if the project: 1) is located within 1,000 feet of a school; 2) causes daily emissions increases greater than provided in subsection (g) of the rule; or 3) causes cancer risks greater than specified in the rule. The District has found that the emissions have been controlled adequately through compliance with Regulation XIII requirements and that a public notice is not required. Therefore, compliance is expected.

Regulation IV – Prohibitions

Rule 401 – Visible Emissions

This rule limits visible emissions from emissions sources, including stationary source exhausts and fugitive dust emission sources. Compliance with this rule is expected. In the PDOC, the District has determined that the facility is expected to comply with this rule.

Rule 402 – Nuisance

This rule restricts discharge of emissions that would cause injury, detriment, annoyance, or public nuisance. The facility is expected to comply with this rule (identical to California Health and Safety Code 41700).

Rule 403 – Fugitive Dust

This rule limits fugitive emissions from certain bulk storage, earthmoving, construction and demolition, and manmade conditions resulting in wind erosion. With the implementation of recommended staff conditions **AQ-SC3**, **AQ-SC4**, and **AQ-SC7** the facility is expected to comply with this rule.

Rule 404 – Particulate Matter Concentration

The rule limits particulate matter (PM) emissions based on the volume discharge rate. The PSPP stationary sources subject to this rule (auxiliary boilers, HTF heaters, and emergency engines) would comply with the PM concentration limits of this regulation.

Rule 409 – Combustion Contaminants

This rule limits discharge into the atmosphere from fuel burning equipment combustion contaminants exceeding in concentration at the point of discharge, 0.1 grain per cubic foot of gas calculated to 12% of carbon dioxide (CO_2) at standard conditions averaged over a minimum of 15 consecutive minutes. The PSPP stationary sources would have particulate concentrations below the limit of this rule.

Rule 431.1 – Sulfur Content of Gaseous Fuels

Rule 431.1 limits discharge into the atmosphere of sulfur compounds from the burning of gaseous fuels. The proposed project would use LPG fuel for boilers and heaters, and the total sulfur emissions would be less than 5 pounds per day, which makes the facility exempt from this rule per section (g)(8).

Rule 431.2 – Sulfur Content of Liquid Fuels

Rule 431.1 limits discharge into the atmosphere of sulfur compounds from the burning of liquid fuels. The proposed project would use ultra-low sulfur diesel fuel for the emergency fire water pump and generator engines to ensure compliance with this rule.

Rule 463 – Organic Liquids Storage

This rule sets standards for storage of organic liquids with a true vapor pressure of 1.5 pounds per square inch or greater. The project would store insulating mineral oil (transformers), hydraulic oil (steam turbine and other equipment), lubricating oil, and diesel fuel on site, all of which have combined storage vessel capacities and true vapor pressures that are below the applicability thresholds for this rule. Therefore, the project would comply with the requirements of this rule.

Rule 474 – Fuel Burning Equipment – Oxides of Nitrogen

This rule limits NOx emission concentrations from stationary sources, with specific concentration levels being based on heat input rates and fuel types (gas/liquid/solid). Compliance is expected with the boilers use of ultra-low-NOx burners and the emergency generator and fire pump engines being Tier 2 and 3 compliant engines, respectively.

Regulation IX – Standards of Performance for New Stationary Sources

Rule 900 – Standard of Performance For New Stationary Source (NSPS)

This rule incorporates the Federal NSPS (40 CFR 60) rules by reference. The proposed boilers are subject to subpart Dc. The District conditions would ensure compliance with the requirements of this rule.

The proposed Tier 2 and Tier 3 engines meet the current emission limit requirements of NSPS Subpart IIII. The exact model and size of the engines are only estimated at this time and it is uncertain exactly when the emergency engines would be purchased and whether Tier 4 engine emission limits may apply at that time. So, staff has added a requirement to the verification of District Condition of Certification (**AQ-17** and **AQ-22**) to require the applicant to provide documentation that demonstrates that the engines purchased meet the appropriate NSPS standards for new engines at the time of purchase.

Regulation XI – Source Specific Standards

Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines

The purpose of this rule is to reduce NOx, VOCs, and CO emissions from engines with 50 hp or higher. The four proposed emergency engines are larger than 50 hp, but are exempt as they would be required by condition to operate less than 200 hours per year.

PSPP would be required to install and maintain an elapsed operating time meter on each engine to determine operating time in compliance with this rule.

Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional and Commercial Boilers, Steam Generators and Process Heaters

Rule 1146 limits NOx emissions from boilers, steam generators, and process heaters with greater than 5 MMBtu/hr rated input capacity used in industrial, institutional, and commercial operations. The proposed boilers with the ultra-low NOx burners would emit NOx emissions under 30 ppmv and good combustion practice would limit CO emissions to less than 400 ppmv. Therefore, the proposed project would be in compliance with Rule 1146.

Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil

This rule sets requirements for the VOC emissions from the handling and decontamination activities of VOC contaminated soils. The applicant is proposing bioremediation (also referred as land farming) of HTF-contaminated soils for the soil decontamination plan. At ambient conditions, the HTF has a very low vapor pressure at ambient temperature, and consequently the VOC emissions from this operation are expected to be negligible. The PSPP would be required to: 1) submit a mitigation plan for approval to excavate the HTF contaminated soils; 2) implement VOC-contaminated soil decontamination measures, as approved by the Executive Officer in writing, at the bioremediation area, and obtain a permit to construct and operate to comply with this rule.

Regulation XIII – New Source Review

Rule 1303 – Requirements

This rule requires implementation of BACT for a new emissions unit. Each of PSPP's equipment would employ current BACT. Offsets are not required for the proposed project since emissions for all pollutants would be less than the applicable offset threshold exemption levels shown in Rule 1304 (d), Table A. Modeling is required if emissions of NOx, CO, and PM10 exceed the emission rates specified in Appendix A, Table A-1. The emissions for PSPP have not been determined to exceed these thresholds; therefore, modeling requirements do not apply.

C.1.13 NOTEWORTHY PUBLIC BENEFITS

Renewable energy facilities, such as PSPP, are needed to meet California's mandated renewable energy goals. While there are no local area air quality public benefits[11] resulting from the proposed project, it would indirectly reduce criteria pollutant emissions within the Southwestern U.S. by reducing fossil fuel–fired generation.

C.1.14 RESPONSE TO AGENCY AND PUBLIC COMMENTS

The applicant has provided comments (Galati & Blek 2010i) that have been addressed, in some cases with minor modifications, as considered acceptable by staff. The only

[11] Air quality benefits should not be confused with greenhouse gas/climate change benefits, which are discussed in Appendix AIR-1.

other agency or public comments received on the SA/DEIS to date are from the South Coast Air Quality Management District.

South Coast Air Quality Management District (SCAQMD 2010b)

The SCAQMD included comments regarding CEQA thresholds of significance, HTF fugitive emissions, emergency generators, and background ambient pollutant concentrations. Each of these comments is responded to separately below.

Thresholds of Significance

The SCAQMD recommends that the Energy Commission use SCAQMD regional significance criteria for determining CEQA impacts and that if impacts are found to be significant all mitigation measures should be considered to reduce these impacts to the extent feasible.

Response: While we understand SCAQMD's interest in using a threshold established for its use, such thresholds vary from district to district. Since staff has to review projects throughout the state, we have selected a single CEQA methodology approach. For example, even the regional emission approach used by SCAQMD is inherently inconsistent in relationship to the variable air quality conditions within the different regions within SCAQMD's jurisdiction. It is clear that the air quality conditions at the PSPP site and within the MDAB portion of SCAQMD's jurisdiction are vastly different, and generally much better, than areas within the South Coast Air Basin (SoCAB), implying very different regional conditions. Yet, the same regional significance criteria are recommended by SCAQMD regardless of location and regional ambient air quality conditions.

Staff believes that our state-wide CEQA methodology provides a more consistent regulatory approach. Staff's approach considers whether a project is or is not in a non-attainment area and requires mitigation for emissions that would either create new exceedances (attainment pollutants) or would contribute to existing exceedances (nonattainment pollutants). For this project staff has considered the state ozone and PM10 non-attainment status of the project site, as well as the expected future cumulative projects in this area of the desert, and have provided what we believe to be comprehensive mitigation measures that will reduce emissions during construction and operation to the maximum extent feasible. In fact, staff believes that the recommended staff mitigation measures are as comprehensive and stringent as, or more comprehensive and stringent than, any other lead agency's proposed mitigation measures for a project such as PSPP. However, if SCAQMD has any specific mitigation measures not included in staff's recommended Conditions of Certification that they would like to recommend to mitigate construction or operation emissions, staff would be willing to evaluate the feasibility and effectiveness and consider adding such mitigation measures.

HTF Fugitive Emissions

The SCAQMD has three separate comments on the HTF fugitive emissions including two related to the Air Quality Section and one related to the Public Health Section that is responded to in that section. The two air quality comments are: 1) Appropriate HTF fugitive emission factors should be used and appropriate mitigation measures employed; and 2) the Inspection and Maintenance Program should require that leak detection and testing be done during peak conditions (elevated HTF temperatures).

Responses: Staff is acutely aware of the issue regarding HTF piping component fugitive emission calculation issues, and provided initial notes regarding inconsistencies and questions on the subject of HTF piping fugitive emission calculation methods and emission factors on January 25th to the four agencies' permitting engineers (including SCAQMD) that were in the process of permitting projects using organic HTF (specifically SCAQMD, Mojave Desert Air Quality Management District [MDAQMD], Eastern Kern Air Pollution Control District [EKAPCD], and San Joaquin Valley Air Pollution Control District). Staff also provided PDOC comment letters that again outlined this issue for each of the projects that obtained a PDOC. Staff worked with EKAPCD staff, the only agency that responded to staff regarding these questions and comments and the only agency that at the time was performing a substantial and independent analysis of this emission source, to determine emission factors and methodology that is currently considered reasonable for the determination of emission from this fugitive emissions source. This revised emission estimate methodology is presented in this RSA. It is possible that SCAQMD may provide in the FDOC an emission estimation and control technology approach that will supplant staff's currently presented methodology. If so, staff will revise the HTF emission source information in staff's Supplemental Staff Assessment.

Staff currently has provided an Inspection and Maintenance Program condition (AQ-SC9) in the absence of such a condition in the PDOC. Because it is expected that leak detection and repair would normally for safety and other reasons be a daylight function, when the HTF is at its peak temperature conditions, staff believes that specifying the timing of leak detection and testing is unnecessary. However, staff anticipates that SCAQMD's FDOC will contain a condition similar to that proposed in the comment, in which case staff will accept it in whole into our analysis.

Emergency Generators

The SCAQMD recommends that the Energy Commission consider mitigating the emergency engine emissions to reduce daily NOx emissions, which are above the SCAQMD regional significance criteria, by limiting daily operation or requiring engines that meet Tier 4 standards.

Response: Engine requirements based on the date of purchase and applicable federal NSPS and ARB ATCM requirements are already in the conditions for this project (see the Verification to Condition **AQ-22**). However, any final revisions to the engine conditions at this time would be speculative and need to await SCAQMD's FDOC, including consideration of any new or revised District conditions on engine operation and technology requirements; where staff would not object to conditions requiring Tier 4 engines if SCAQMD believes such conditions are necessary for Best Available

Technology/Lowest Available Emission Rate (BACT/LAER) or other District Rule compliance. However, it should be noted that emergency generators are not exempt from meeting Tier 4 standards under ARB ATCM requirements, and given staff's current condition verification requirements we believe that the applicant will have to obtain Tier 4 engines, at least transitional Tier 4 engines, to comply with Condition AQ-22 if that condition is not revised by SCAQMD in the FDOC. This issue will be resolved in a supplement to this section that will include the revised SCAQMD FDOC conditions.

Background Criteria Pollutant Concentrations

The SCAQMD recommends that Indio background data be used in place of Palm Springs monitoring data for PM10 and PM2.5, due to its greater proximity to the PSPP project site.

Response: Staff considered the use of a number of monitoring stations for background concentration data given the fact that there are no monitoring stations located anywhere near the project site within SCAQMD jurisdiction and only one monitoring station is located within the Riverside County portion of the MDAB (Blythe), which only monitors ozone concentrations. Staff selected Palm Springs for reporting background PM10 and PM2.5 concentrations for the following reasons:

1. Greater consistency among the ambient pollutant levels provided.
2. Staff believes that any pollutant concentrations from monitoring stations located that much closer to the SoCAB, considering the wind driven exceptional events, would be conservative in comparison to the real ambient concentrations experienced at the very remote PSPP site.
3. The expectation that peak localized particulate ambient concentrations in Indio are significantly influenced by the local agriculture and large areas of unstabilized soils, while there is only very limited agricultural emissions and essentially no industrial source emissions, in the area surrounding the remote PSPP project site.

For these reasons staff believes that the use of Palm Springs background data provides a conservative estimate of the background ambient PM10 and PM2.5 concentrations that would actually be experienced at the PSPP project site.

C.1.15 MITIGATION MEASURES/ PROPOSED CONDITIONS OF CERTIFICATION

C.1.15.1 STAFF 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 30 days prior to the start of ground disturbance, the project owner shall submit to the 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 30 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The AQCMP shall include effectiveness and environmental data for the proposed soil stabilizer. The CPM will notify the project owner of any necessary modifications to the plan within 15 days from the date of receipt.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report that demonstrates compliance with the Air Quality Construction Mitigation Plan (AQCMP) mitigation measures for the purposes of minimizing fugitive dust emission creation from construction activities and preventing all fugitive dust plumes that would not comply with the performance standards identified in **AQ-SC4** from leaving the project site. The following fugitive dust mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**, and any deviation from the AQCMP mitigation measures shall require prior CPM notification and approval.

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 or treated prior to taking initial deliveries.

b. All unpaved construction roads and unpaved operation and maintenance 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 to areas beyond where the soil stabilizers are being applied for dust control. All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading (consistent with Biology Conditions of Certification that address the minimization of standing water); 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.

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.

Verification: The AQCMM shall provide the CPM a Monthly Compliance Report 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 CPM or AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

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 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 before that time.

Verification: The AQCMM shall provide the CPM a Monthly Compliance Report 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 or 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 Monthly Compliance Report, a construction mitigation report that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related emissions. The following off-road diesel construction equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**, and any deviation from the AQCMP mitigation measures shall require prior 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 to the satisfaction of the CPM that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. 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 10 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 practical.

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 the following to demonstrate control of diesel construction-related emissions:

A. A summary of all actions taken to control diesel construction related emissions;

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 vehicles that meet California on-road vehicle emission standards or appropriate U.S.EPA/California off-road engine emission standards for the latest model year available when obtained.

Verification: At least 30 days prior to the start commercial operation, 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.

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 minimizing fugitive dust emission creation from operation and maintenance activities and preventing all fugitive dust plumes that would not comply with the performance standards identified in **AQ-SC4** from leaving the project site; 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 as efficient as or more efficient for fugitive dust control than ARB approved soil stabilizers, and that shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control.

The performance and application of the fugitive dust controls shall also be measured against and meet the performance requirements of condition **AQ-SC4**. The measures and performance requirements of **AQ-SC4** shall also be included in the operations dust control plan.

Verification: At least 30 days prior to start of commercial operation, the project owner shall submit to 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. Within 60 days after commercial operation, the project owner shall provide to 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) documents for the facility.

The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project federal air permit. The project owner shall submit to the CPM any modification to any federal air

permit proposed by the District or U.S. Environmental Protection Agency (U.S. EPA), and any revised federal air permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any ATC, PTO, and proposed federal air permit modifications 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 ATC/PTO documents and all federal air permits to the CPM within 15 days of receipt.

AQ-SC9 The project owner shall establish an inspection and maintenance program to determine, repair, and log leaks in the HTF piping network and expansion tanks. Inspection and maintenance program and documentation shall be available to the CPM upon request.

Verification: The project owner shall establish an inspection and maintenance that that at a minimum includes the following:

A. All pumps, compressors and pressure relief devices (pressure relief valves or rupture disks) shall be electronically, audio, or visually inspected once every operating period.

B. All accessible valves, fittings, pressure relief devices (PRDs), hatches, pumps, compressors, etc. shall be inspected quarterly using a leak detection device such as a Foxboro OVA 108 calibrated for methane.

C. VOC leaks greater than 100-ppmv shall be tagged (with date and concentration) and repaired within seven calendar days of detection.

D. VOC leaks greater than 10,000-ppmv shall be tagged and repaired within 24-hours of detection.

E. The project owner shall maintain a log of all VOC leaks exceeding 10,000-ppmv, including location, component type, and repair made.

F. The project owner shall maintain record of the amount of HTF replaced on a monthly basis for a period of five years.

G. Any detected leak exceeding 100-ppmv and not repaired in 7-days and 10,000-ppmv not repaired within 24-hours shall constitute a violation of the District's Authority to Construct (ATC)/Permit to Operate (PTO).

H. Pressure sensing equipment shall be installed that will be capable of sensing a major rupture or spill within the HTF network.

The inspection and maintenance plan shall be submitted to the CPM for review and approval at least 30 days before taking delivery of the HTF. The project owner shall make the site available for inspection of HTF piping Inspection and Maintenance Program records and HTF system equipment by representatives of the District, ARB, and the Energy Commission.

AQ-SC10 The project owner shall operate the cooling towers with high efficiency mist eliminators and shall determine and report water quality and annual emissions.

Verification: The project owner shall provide the following at least 30 days prior to installation of the cooling tower to the CPM for review and approval:

A. The manufacturer specifications for the cooling tower, that provides the number of cells and design recirculating water flow rate for the two cooling towers.

B. The manufacturer specifications for the mist eliminators that provide a manufacturer guarantee that the mist eliminators will reduce drift to no more than 0.0005% of recirculating water flow.

The project owner shall provide the following in the Annual Compliance Reports:

C. The sampling data for the recirculating water TDS concentration, performed at least quarterly, that demonstrates that the annual average TDS concentration was no more than 2,000 milligrams per liter (ppmw).

D. The estimated annual particulate emissions from the cooling tower using the following equation: (annual gallons of water recirculated) x (0.000005 fraction mist) x (average annual TDS concentration in mg/l) / (1,000,000) x (8.34 lbs/gallon).

Staff Condition for Project Alternatives

AQ-SC11 The project owner shall confirm that the operation of emergency engines will not exceed the state or federal 1-hour NO_2 ambient air quality standards by either of the following methods:

1) The applicant will provide an air dispersion modeling analysis that demonstrates to staff's satisfaction that the currently proposed or officially revised worst-case operating emissions would not have the potential to cause exceedances of the state or federal 1-hour NO_2 ambient air quality standards, or

2) The applicant will procure emergency generator engines that meet ARB Tier 4 standards for NOx emissions (0.5 grams per break horsepower).

Verification: The project owner shall provide to the CPM the air dispersion modeling analysis, if performed, that demonstrates compliance with Part 1) of this condition at least 30 days prior to purchasing the emergency engine generators for this project, or shall provide documentation to the CPM at least 5 days prior to purchasing the engine generators that they comply with Part 2) of this condition.

C.1.15.2 DISTRICT CONDITIONS

District Preliminary Determination of Compliance Conditions (SCAQMD 2010a)

Standard Conditions

Standard conditions **AQ-1** and **AQ-2** apply to all permitted equipment.

AQ-1 Operation of this equipment shall be conducted in accordance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-2 This equipment shall be properly maintained and kept in good operating condition at all times.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

Application No. 506828 and 506834 (Two 35 MMBtu/hr LPG-fired Auxiliary Boilers)

EQUIPMENT DESCRIPTION:

BOILER, AUXILLIARY STEAM, NEBRASKA, MODEL NB-201D-45-SH, 35 MMBTU/HR, WATER TUBE, PROPANE FIRED, 29,000 LB/HR STEAM AT 165 PSIG, 480 DEGREES FAHRENHEIT, EQUIPPED WITH A CB NATCOM, MODEL NO. (TBD) ULTRA-LOW NOx RAPID MIX BURNER.

AQ-3 This equipment shall be fired exclusively with propane.

Verification: The project owner shall maintain records of the propane/LPG deliveries and specifications onsite for a period of two years and shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-4 The project owner shall conduct source test(s) for the pollutant(s) identified below. .

Pollutant to be Tested	Required Test Method(s)	Averaging Time	Test Location
NOx emissions	District Method 100.1	1 hour	Stack
CO emissions	District Method 100.1	1 hour	Stack
SOx emissions	Approved District method	District approved averaging time	Fuel Sample
VOC emissions	Approved District method	1 hour	Stack
PM10 emissions	Approved District method	District approved averaging time	Stack

The test shall be conducted after AQMD approval of the source test protocol, but no later than 180 days after initial start-up. The AQMD shall be notified of the date and time of the test at least 10 days prior to the test.

The test shall be conducted to determine the oxygen levels in the exhaust. In addition, the tests shall measure the fuel flow rate (CFH), the flue gas flow rate.

The test shall be conducted in accordance with AQMD approved test protocol. The protocol shall be submitted to the AQMD engineer no later than 45 days before the proposed test date and shall be approved by the AQMD before the test commences. The test protocol shall include the proposed operating conditions of the turbine during the tests, the identity of the testing lab, a statement from the testing lab certifying that it meets the criteria of Rule 304, and a description of all sampling and analytical procedures.

The test shall be conducted when this equipment is operating at maximum, average, and minimum loads.

Verification: The project owner shall provide a source test protocol to the District for approval and CPM for review at least 45 days prior to the first source test. The project owner shall notify the District and the CPM within 10 working days before the execution of the source test required in this condition. The test shall be conducted within 180 days after initial start-up and the test results shall be submitted to the District and to the CPM within 60 days after test was conducted.

AQ-5 The project owner shall limit the fuel usage to no more than 393 mmcf in any one year. For the purpose of this condition, one year shall be defined as a period of 12 consecutive months determined on a rolling basis with a new 12-month period beginning on the first day of each calendar month.

For the purpose of this condition, fuel usage shall be defined as the total propane usage of a single boiler. The project owner shall maintain records in a manner approved by the District to demonstrate compliance with this condition.

Verification: The project owner shall submit records required by this condition in the Annual Compliance Report, including **the monthly start and end readings of the fuel flow meter (**AQ-6**)**.

AQ-6 The project owner shall install and maintain a(n) flow meter to accurately indicate the fuel usage being supplied to the boiler. The project owner shall also install and maintain a device to continuously record the parameter being measured.

Verification: At least 30 days prior to the installation of the boiler, the project owner shall provide the District and the CPM the specification of the flow meter.

AQ-7 The project owner shall provide to the AQMD a source test report in accordance with the following specifications:

- Source test results shall be submitted to the AQMD no later than 60 days after the source test was conducted.
- Emission data shall be expressed in terms of concentration (ppmv) corrected to 3% oxygen (dry basis), mass rate (lb/hr), and lb/MMCF. In addition, solid PM emissions, if required to be tested, shall also be reported in terms of grains/DSCF.
- All exhaust flow rate shall be expressed in terms of dry standard cubic feet per minute (DSCFM) and dry actual cubic feet per minute (DACFM).
- All moisture concentration shall be expressed in terms of percent corrected to 3% oxygen.

Source test results shall also include the oxygen levels in the exhaust, fuel flow rate (CFH), the flue gas temperature.

Verification: None required.

AQ-8 The 9 PPM NOx emission limits shall not apply during start-up and shutdown periods. Written records of start-ups and shutdowns shall be maintained and made available upon request from the Executive Officer.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-9 The 50 PPM CO emission limits shall not apply during start-up and shutdown periods. Written records of start-ups and shutdowns shall be maintained and made available upon request from the Executive Officer.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-10 The project owner shall limit emission from this equipment as follows:

Contaminant	Emission Limit
PM10	569 lbs/year
NOx	632 lbs/year
SOx	283 lbs/year
VOC	284 lbs/year

The project owner shall calculate the monthly emissions for VOC, PM10 and SOx using the equation below and the following emission factors: NOx: 1.27 lb/mmcf; VOC: 0.57 lb/mmcf; PM10: 1.15 lb/mmcf; and SOx:1.30 lb/mmcf.

Yearly Emissions, lb/year = X (E.F.)
where X = yearly fuel usage in mmscf/year and E.F. = emission factor indicated above.

For the purpose of this condition, the yearly emission limit shall be defined as a period of 12 consecutive months determined on a rolling basis with a new 12-month period beginning on the first day of each calendar month.

Verification: As part of the Annual Compliance Report, the project owner shall include information demonstrating compliance with the boiler operating emission rates.

AQ-11 The project owner shall limit the annual operation of this equipment to no greater than 5,000 hours in any one year.

Verification: The project owner shall submit to the CPM the boiler hours of use records demonstrating compliance with this condition as part of the Annual Operation Report.

AQ-12 The project owner shall limit the fuel usage to no more than 172 mmcf in any one calendar year. The project owner shall maintain records in a manner approved by the District to demonstrate compliance with this condition.

Verification: The project owner shall submit records required by this condition in the Annual Compliance Report, including **a photograph showing the annual reading of flow meter**. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

Application No. 506831 and 506836 (Two Emergency Fire Pump Engines)

EQUIPMENT DESCRIPTION:

INTERNAL COMBUSTION ENGINE, EMERGENCY, 300 BHP, DIESEL FUELED, CATERPILLAR, MODEL NO. 9CPXL08.8ESK, LEAN BURN, FOUR CYCLE, TURBOCHARGED AND AFTERCOOLED, DRIVING A FIRE PUMP.

AQ-13 The project owner shall limit the operating time to no more than 199.99 hours in any one year. For the purposes of this condition, the operating time is inclusive of time allotted for maintenance and testing.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-14 The project owner shall install and maintain a(n) non-resettable elapsed meter to accurately indicate the elapsed operating time of the engine.

Verification: At least 30 days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the hour meter.

AQ-15 The project owner shall install and maintain a(n) non-resettable totalizing fuel meter to accurately indicate the fuel usage of the engine.

Verification: At least 30 days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the fuel meter.

AQ-16 The project owner shall only use diesel fuel containing sulfur less than or equal to 15 ppm by weight.

Verification: The project owner shall make the site available for inspection of equipment and fuel purchase records by representatives of the District, ARB, and the Energy Commission.

AQ-17 The project owner shall operate and maintain this equipment according to the following requirements:

a. This equipment shall only operate if utility electricity is not available.

b. This equipment shall only be operated for the primary purpose of providing a backup source of power to drive an emergency fire pump.

c. This equipment shall only be operated for maintenance and testing, not to exceed 50 hours in any one year.

d. This equipment shall only be operated under limited circumstances under a Demand Response Program (DRP).

e. An engine operating log shall be kept in writing, listing the date of operation, the elapsed time, in hours, and the reason for operation. The log shall be maintained for a minimum of 5 years and made available for AQMD personnel upon request.

f. The project owner shall keep records in a manner approved by the Executive Officer, for the date of operation, the elapsed time, in hours, and the reason for operation of the engine.

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 and ARB ATCM emission limit requirements at the time of engine purchase. The project owner shall submit records required by this condition that demonstrating compliance with the engine use and sulfur content limitations of conditions **AQ-13** and **AQ-16** and the engine limitations of this condition in the Annual Compliance Report, including **a photograph showing the annual reading of engine hours**. The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

Application Nos. TBD (Two Emergency Electrical Generator Engines)

EQUIPMENT DESCRIPTION:

INTERNAL COMBUSTION ENGINE, EMERGENCY, 2,922 BHP, CUMMINS, DIESEL FUELED, LEAN BURN, FOUR CYCLE, MODEL NO. QSK60-G6, TURBOCHARGED AND AFTERCOOLED, DRIVING AN ELECTRICAL GENERATOR RATED AT 2.18 MW.

AQ-18 The project owner shall limit the operating time to no more than 199.99 hours in any one year. For the purposes of this condition, the operating time is inclusive of time allotted for maintenance and testing.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-19 The project owner shall install and maintain a(n) non-resettable elapsed meter to accurately indicate the elapsed operating time of the engine.

Verification: At least 30 days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the hour meter.

AQ-20 The project owner shall install and maintain a(n) non-resettable totalizing fuel meter to accurately indicate the fuel usage of the engine.

Verification: At least 30 days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the fuel meter.

AQ-21 The project owner shall only use diesel fuel containing sulfur less than or equal to 15 ppm by weight.

Verification: The project owner shall make the site available for inspection of equipment and fuel purchase records by representatives of the District, ARB, and the Energy Commission.

AQ-22 The project owner shall operate and maintain this equipment according to the following requirements:

a. This equipment shall only operate if utility electricity is not available.

b. This equipment shall only be operated for the primary purpose of providing a backup source of power to drive an emergency electrical generator.

c. This equipment shall only be operated for maintenance and testing, not to exceed 50 hours in any one year.

d. This equipment shall only be operated under limited circumstances under a Demand Response Program (DRP).

e. An engine operating log shall be kept in writing, listing the date of operation, the elapsed time, in hours, and the reason for operation. The log shall be maintained for a minimum of 5 years and made available for AQMD personnel upon request.

f. The project owner shall keep records in a manner approved by the Executive Officer, for the date of operation, the elapsed time, in hours, and the reason for operation of the engine.

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 and ARB ATCM emission limit requirements at the time of engine purchase. The project owner shall submit records required by this condition that demonstrating compliance with the engine use and sulfur content limitations of conditions **AQ-18** and **AQ-21** and the engine limitations of this condition in the Annual Compliance Report, including **a photograph showing the annual reading of engine hours**. The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

Application No. 506829 and 506833 (Two HTF Ullage Vent Control Systems)

EQUIPMENT DESCRIPTION:

STORAGE TANK, HEAT TRANSFER FLUID, 15,900 GALLONS, HEIGHT: 22 FEET; DIAMETER: 12 FEET, VENTED TO AN ACTIVATED CARBON ADSORPTION SYSTEM WITH TWO CANISTERS IN SERIES, CAPACITY: 2,000 POUNDS.

AQ-23 The project owner shall monitor for breakthrough between the first and second carbon beds while the carbon system is in use using an OVA or other monitoring device as approved by the Executive Officer. The carbon in the first bed shall be replaced with fresh carbon at least 5 times per month as necessary, prior to occurrence of breakthrough in the second carbon bed.

Verification: The project owner shall provide a summary of the carbon bed monitoring data as part of the Annual Compliance Report and shall submit tests to the District as required in this condition.

C.1.16 CONCLUSIONS

- Staff has made the following conclusions about the PSPP:
- The proposed project would comply with applicable District Rules and Regulations and staff recommends the inclusion of the District's PDOC conditions as Conditions of Certification **AQ-1** through **AQ-23.**
- If left unmitigated, the proposed project's construction activities would likely contribute to significant CEQA adverse PM10 and ozone impacts. Staff recommends **AQ-SC1** to **AQ-SC5** to mitigate the potential impacts.
- The proposed project's operation would not cause new violations of any NO_2, SO_2, PM2.5 or CO ambient air quality standards. Therefore, the project-direct operation NOx, SOx, PM2.5 and CO emission impacts are not CEQA significant.
- The proposed project's direct and indirect, or secondary emissions contribution to existing violations of the ozone and PM10 ambient air quality standards are likely CEQA significant if unmitigated. Therefore, staff recommends **AQ-SC6** to mitigate the onsite maintenance vehicle emissions and **AQ-SC7** to mitigate the operating fugitive dust emissions to ensure that the potential ozone and PM10 CEQA impacts are mitigated to less than significant over the life of the project.
- To ensure that the two HTF piping networks emissions are adequately controlled through an inspection and maintenance program, staff recommends **AQ-SC9**.
- To ensure that the two auxiliary cooling towers emissions are adequately controlled through the use of a high efficiency mist eliminator and control of the recirculating water total dissolved solids content, staff recommends **AQ-SC10**.
- To ensure that the project alternatives, if any one of them is approved, do not create significant short term NO_2 impacts staff has recommended Condition of Certification **AQ-SC11** that is only applicable to the project alternatives,
- The proposed project would be consistent with the requirements of SB 1368 and the Emission Performance Standard for greenhouse gases (see **Appendix Air-1**).

C.1.17 REFERENCES

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Solar Millennium 2010n – Solar Millennium, (tn: 57792). Applicant's Data Responses to Alternatives 2 & 3, dated 7/20/2010.

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ACRONYMS

AAQS	Ambient Air Quality Standard
ACC	Air Cooled Condenser
AERMOD	ARMS/EPA Regulatory Model
AFC	Application for Certification
APCO	Air Pollution Control Officer
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
ASOS	Automated Surface Observing Systems
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
bhp	brake horsepower
BLM	Bureau of Land Management
Btu	British Thermal Unit
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CPM	(CEC) Compliance Project Manager
DPM	Diesel Particulate Matter
Degrees F	Degrees Fahrenheit
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EKAPCD	Eastern Kern Air Pollution Control District
EPA	Environmental Protection Agency
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
GHG	Greenhouse Gas
H_2S	Hydrogen Sulfide

HTF	Heat Transfer Fluid
hp	horsepower
HSC	Health and Safety Code
kV	Kilovolt
lbs	Pounds
LORS	Laws, Ordinances, Regulations and Standards
LLC	Limited Liability Company
LPG	Liquefied Petroleum Gas
MCR	Monthly Compliance Report
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
μg/m3	microgram per cubic meter
mg/m3	milligrams per cubic meter
MMBtu/hr	Million British Thermal Units per Hour
MW	Megawatts (1,000,000 Watts)
MWh	Megawatt-hour
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Protection Act
NMHC	Non-Methane Hydrocarbon
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen or Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
O_2	Oxygen
O_3	Ozone
OLM	Ozone Limiting Method
PDOC	Preliminary Determination Of Compliance
PM	Particulate Matter
PM10	Particulate Matter less than 10 microns in diameter
PM2.5	Particulate Matter less than 2.5 microns in diameter
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
PSPP	Palen Solar Power Project
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct

PTO	Permit to Operate
RO	Reverse Osmosis
ROW	Right of Way
RSA	Revised Staff Assessment (this document)
SA/DEIS	Staff Assessment/Draft Environmental Impact Statement
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
scf	standard cubic feet
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_4	Sulfate
SOx	Oxides of Sulfur
SoCAB	South Coast Air Basin
SSAB	Salton Sea Air Basin
SWPPP	Storm Water Pollution Prevention Plan
TDS	Total Dissolved Solids
tpy	tons per year
U.S.EPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WC	Weather Channel

APPENDIX AIR-1 – GREENHOUSE GAS EMISSIONS

Testimony of William Walters, P.E.

SUMMARY OF CONCLUSIONS[12]

The Palen Solar Power Project (PSPP) is a proposed addition to the state's electricity system. PSPP is a solar concentrating thermal power plant, which would utilize parabolic trough solar thermal technology to solar heat a heat transfer fluid (HTF). This hot HTF would be used to generate steam in a solar steam generator. The proposed project is comprised of two solar plants, each of which would have 250-MW capacity, totaling 500 MW. As a solar project, its greenhouse gas (GHG) emissions would be considerably less than the existing statewide average GHG emissions per unit of generation and considerably less than the GHG emissions from existing fossil fuel–fired power plants providing generation to California, and thus would contribute to continued reduction of GHG emissions in the interconnected California and the western United States electricity systems.

While PSPP would emit some GHG emissions, the contribution of PSPP to the system build-out of renewable resources to meet the goals of the Renewable Portfolio Standard (RPS) in California would result in a net cumulative reduction of energy generation and GHG emissions from new and existing fossil fuel–fired electricity resources. Electricity is produced by operation of inter-connected generation resources. Operation of one power plant, like PSPP, affects all other power plants in the interconnected system. PSPP would be a "must-take" facility and its operation would affect the overall electricity system operation and GHG emissions in several ways:

- PSPP would provide low-GHG, renewable generation.
- PSPP would facilitate to some degree the replacement of high GHG emitting (e.g., coal) electricity generation whose contracts are due to expire and cannot be renewed due to the State's 2006 Emissions Performance Standard.
- PSPP could facilitate to some extent the replacement of generation provided by aging fossil fuel–fired power plants that use once-through cooling.

These system impacts would result in a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff concludes that the proposed project would result in a cumulative overall reduction in GHG emissions from power plants, does not worsen current conditions, and would not result in impacts that are cumulatively CEQA significant.

Staff concludes that the short-term minor emission of greenhouse gases during construction that are necessary to create this new, low GHG-emitting power generating facility would be sufficiently reduced by "best practices" and would be more than offset by GHG emission reductions during operation. Thus, construction GHG emissions would not be CEQA significant.

[12] Staff's conclusions provided in the SA/DEIS have not changed. This Revised Staff Assessment (RSA) includes updated regulatory information and applicant information regarding minor changes to the project description and new project alternatives (Galati & Blek 2010i, Solar Millennium2010l).

The PSPP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

The California Air Resources Board (ARB) has promulgated regulations for mandatory GHG emission reporting to comply 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). The PSPP, which solely generates electricity from solar power, is exempt from the mandatory GHG emission reporting requirements for electricity generating facilities [CCR Title 17 §95101(c)(1)]. However, the proposed project may be subject to future reporting requirements and GHG reductions or trading requirements as additional state or federal GHG regulations are developed and implemented.

INTRODUCTION

Greenhouse gas (GHG) emissions are not criteria pollutants, but they are discussed in the context of cumulative impacts. However, on April 2, 2007, the U.S. Supreme Court found that GHGs are pollutants that must be covered by the federal Clean Air Act. In response, on September 30, 2009, the U.S. Environmental Protection Agency (U.S. EPA) proposed to apply Prevention of Significant Deterioration (PSD) requirements to facilities whose carbon dioxide-equivalent emissions exceed 25,000 tons per year (U.S.EPA 2009c). On May 13, 2010, U.S. EPA announced a final rule “tailoring” GHG emissions to Prevention of Significant Deterioration (PSD) requirements (U.S.EPA 2010a) and raised the emissions threshold for rule applicability to 100,000 tons per year of carbon dioxide equivalent emissions.

The state has demonstrated a clear willingness to address global climate change through research, adaptation and inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

Generation of electricity can produce greenhouse gases with the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. For fossil fuel–fired power plants, the GHG emissions include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N_2O, not NO or NO_2, which are commonly known as NOx or oxides of nitrogen), and methane (CH_4 – often from unburned natural gas). For solar energy generation projects the stationary source GHG emissions are much smaller than fossil fuel–fired power plants, but the associated maintenance vehicle emissions are higher. Other sources of GHG emissions include sulfur hexafluoride (SF_6) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO_2 emissions from carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high global warming potentials.

Global warming potential is a relative measure, compared to carbon dioxide, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are converted into carbon dioxide equivalent (CO2E) metric tonnes (MT) for ease of comparison.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies in **Greenhouse Gas Table** 1 pertain to the control and mitigation of greenhouse gas emissions. Staff's analysis examines the proposed project's compliance with these requirements.

Greenhouse Gas Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
40 Code of Federal Regulations (CFR) Part 98	This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2 equivalent emissions per year.
40 CFR Parts 51, 52, 70 and 71.	This rule "tailors" GHG emissions to PSD and Title V permitting applicability criteria.
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	This act requires the California Air Resource Board (ARB) to enact standards that will reduce GHG emission to 1990 levels by 2020. Electricity production facilities will be regulated by the ARB.
California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.	These ARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 $MTCO_2$/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO_2/MWh).

GLOBAL CLIMATE CHANGE AND ELECTRICITY PRODUCTION

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 finds 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).

In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts

associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state require reporting of greenhouse gases (GHG) or global climate change[13] emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020.[14] To achieve this, ARB has a mandate to define the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide scoping plan in December 2008 to identify how emission reductions will be achieved from major sources of GHG via regulations, market mechanisms, and other actions. ARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (ARB 2006). The regulations must be effective by January 1, 2011 and mandatory compliance commences on January 1, 2012. The mandatory reporting requirements are effective for electric generating facilities with a nameplate capacity equal or greater than 1 megawatt (MW) capacity if their emissions exceed 2,500 metric tonnes per year. The due date for initial reports by existing facilities was June 1, 2009.

Examples of strategies that the state might pursue for managing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, were identified in the California Climate Action Team's Report to the Governor (CalEPA 2006). The scoping plan approved by ARB in December 2008 builds upon the overall climate policies of the Climate Action Team report and shows the recommended strategies to achieve the goals for 2020 and beyond. Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy), land use planning, and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). The scoping plan includes a requirement for 33% of California's electrical energy to be provided from renewable sources by 2020 (implementing California's 33% RPS goal), aggressive energy efficiency targets, and a cap-and-trade system that includes the electricity sector (ARB 2008b).

It is likely that GHG reductions mandated by ARB will not be uniform across emitting sectors, in that reductions will be based on cost-effectiveness (i.e., the greatest effect for the least cost). For example, the ARB proposes a 40% reduction in GHG from the electricity sector, even though that sector currently only produces about 25% of the state's GHG emissions. In response, in September 2008 the Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on

[13] Global climate change is the result of greenhouse gases, or air emissions with global warming potentials, affecting the global energy balance, and thereby, climate of the planet. The term greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably.

[14] Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050.

how to achieve such reductions through both programmatic and regulatory approaches, and identified regulation points should ARB decide that a multi-sector cap and trade system is warranted.

The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addressed climate change within the electricity, natural gas, and transportation sectors (CEC 2007). For the electricity sector, it recommended such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33% renewable portfolio standard. The Energy Commission's *2009 Integrated Energy Policy Report* continues to emphasize the importance of meeting greenhouse gas emissions reduction goals along with other important statewide issues such as backing out use of once-through cooling in coastal California power plants (CEC 2009d).

SB 1368,[15] enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibits California utilities from entering into long-term commitments with any base load facilities that exceed the Emission Performance Standard of 0.500 metric tonnes CO_2 per megawatt-hour[16] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 Emission Performance Standard (EPS) applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.[17] If a project, instate or out of state, plans to sell base load electricity to a California utility under a long term contract, that utility will have to demonstrate that the project meets the EPS. *Base load* units are defined as units that operate at a capacity factor higher than 60%. As a renewable electricity generating facility, PSPP is determined by rule to be compliant with the SB 1368 EPS.

In addition to these programs, California is involved in the Western Climate Initiative, a multi-state and international effort to establish a cap and trade market to reduce greenhouse gas emissions in the Western United States and the Western Electricity Coordinating Council (WECC). The timelines for the implementation of this program are similar to those of AB 32, with full roll-out beginning in 2012. And as with AB 32, the electricity sector has been a major focus of attention.

ELECTRICITY PROJECT GREENHOUSE GAS EMISSIONS

Electricity use can be as simple as turning on a switch to operate a light or fan. The system to deliver adequate and reliable electricity supply is complex and variable. But it operates as an integrated whole to meet demand, such that the dispatch of a new source of generation generally curtails or displaces one or more less efficient or less competitive existing sources. Within the system, generation resources provide electricity, or energy, generating capacity, and ancillary services to stabilize the system and facilitate electricity delivery, or movement, over the grid. *Capacity* is the instantaneous output of a resource, in megawatts. *Energy* is the capacity output over a unit of time, for example an hour or year, generally reported as megawatt-hours or gigawatt-hours

[15] Public Utilities Code § 8340 et seq.

[16] The Emission Performance Standard only applies to carbon dioxide, and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

[17] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

(GWh). Ancillary services[18] include regulation, spinning reserve, non-spinning reserve, voltage support, and black start capability. Individual generation resources can be built and operated to provide only one specific service. Alternatively, a resource may be able to provide one or all of these services, depending on its design and constantly changing system needs and operations.

California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system mix. 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. Greenhouse gas emissions contribute to the warming of the earth's atmosphere, leading to climate change.

PROJECT CONSTRUCTION

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. The construction would last approximately 39 months. The greenhouse gas emissions estimate, for the entire construction period, provided by the applicant is below in **Greenhouse Gas Table 2**.

Greenhouse Gas Table 2
Estimated PSPP Potential Construction Greenhouse Gas Emissions

Construction Element	CO_2-Equivalent (MTCO2E)[1,2,3]
On-Site Construction Equipment	70,200
On-Site Motor Vehicles	1,500
Off-Site Motor Vehicles	29,300
Construction Total	101,000

Notes:
1 - One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms
2 - The vast majority of the CO2E emissions, over 99%, is CO_2 from these combustion sources.
3 - This does not include the revised construction description that now includes an onsite concrete batch plant and on-site fuel depot. On balance staff believes that these changes will not significantly impact the totals, which might be estimated to be higher or lower depending the balance of how concrete and fuel deliveries would have been handled versus the deliveries of the materials to make concrete (sand, aggregate, cement, water) and daily fueling of equipment by fuel/lube truck(s).
Source: Solar Millennium 2010d, Table DR-AIR-18-1.

PROJECT OPERATIONS

Operations GHG emissions, for both units, are shown in **Greenhouse Gas Table 3**. Operation of the PSPP would cause GHG emissions from the auxiliary boilers, HTF heaters, fire pump engines, emergency generator engines, maintenance fleet and employee trips, and sulfur hexafluoride emissions from new electrical component equipment.

[18] See page CEC 2009b, page 95.

Greenhouse Gas Table 3
Estimated PSPP Potential Operating Greenhouse Gas Emissions

	Annual CO_2 Equivalent (MTCO2E)[1]
Auxiliary Boilers[2]	7,710
Emergency Generators[2]	144
Fire Pumps[2]	16
Maintenance Vehicles[2]	109
Delivery Vehicles[2]	4,507
Employee Vehicles[2]	2,320
Equipment Leakage (SF_6)	12
Total Project GHG Emissions – MTCO2E[2]	**14,818**
Facility MWh per year	1,000,000
Facility GHG Emission Rate (MTCO2E/MWh)	0.015

Notes:
1 - One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
2 - The vast majority of the CO2E emissions, over 99%, is CO_2 from these emission sources.
Sources: Solar Millennium 2009a; AECOM 2010a, Attachment DR-AIR-2 and DR-AIR-18; Galati & Blek 2010i; and employee vehicle emissions have been estimated by staff.

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. All emissions are converted to CO_2-equivalent and totaled. Electricity generation GHG emissions are generally dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG are typically small and also are more likely to be easily controlled or reused/recycled. For this solar project the primary fuel, solar energy, is greenhouse gas free, but there is propane used in the two auxiliary boilers used for morning startup and HTF freeze protection, and gasoline and diesel fuel use in the maintenance vehicles, offsite delivery vehicles, staff and employee vehicles, the two emergency fire water pump engines, and two emergency generator engines. Another GHG emission source for this proposed project is SF_6 from electrical equipment leakage.

The proposed project is estimated to emit, directly from primary and secondary emission sources on an annual basis, over 10,000 metric tonnes of CO_2-equivalent GHG emissions per year. PSPP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]). Regardless, PSPP has an estimated GHG emission rate of 0.015 MTCO2E/MWh, well below the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh.

Solar Project Energy Payback Time

The beneficial energy and greenhouse gas impacts of renewable energy projects can also be measured by the *energy payback time.*[19] **Greenhouse Gas Tables 2** and **3** provide an estimate of the onsite construction and operation emissions, employee transportation emissions, and the final segment of offsite materials and consumables transportation. However, there are additional direct transportation and indirect

[19] The energy payback time is the time required to produce an amount of energy as great as what was consumed during production, which in the context of a solar power plant includes all of the energy required during construction and operation.

manufacturing GHG emissions associated with the construction and operation of the proposed project, which are all considered in the determination of the energy payback time. A document sponsored by Greenpeace estimates that the energy payback time for concentrating solar power plants, such as PSPP, to be on the order of 5 months (Greenpeace 2005, Page 9); and the project life for PSPP is on the order of 30 years. Therefore, the proposed project's GHG emissions reduction potential from energy displacement would be substantial.[20]

Natural Carbon Uptake Reduction

This proposed project would cause the clearing of land and removal of vegetation, which would reduce the ongoing natural carbon uptake by vegetation. A study of the Mojave Desert indicated that the desert may uptake carbon in amounts as high as 100 grams per square meter per year (Wohlfahrt et al. 2008). This would equate to a maximum reduction in carbon uptake, calculated as CO_2, of 1.48 MT of CO_2 per acre per year for areas with complete vegetation removal. For this approximately 4,000[21]-acre proposed project, which does require the complete removal of vegetation over most of the project site, the maximum equivalent loss in carbon uptake would be 5,920 MT of CO_2 per year, which would correspond to 0.006 MT of CO_2 per MW generated. Therefore, the natural carbon uptake loss is negligible in comparison with the reduction in fossil fuel CO_2 emissions, which can range from 0.35 to 1.0 MT of CO_2 per MW depending on the fuel and technology, that is enabled by this proposed project.

CLOSURE AND DECOMMISSIONING

Closure and decommissioning, as a one-time limited duration event, would have emissions that are similar in type and magnitude, but likely lower than, the construction emissions as discussed above.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses four kinds of impacts: construction, operation, closure and decommissioning, and cumulative effects. As the name implies, construction impacts result from the emissions occurring during the construction of the proposed project. The operation impacts result from the emissions of the proposed project during operation. Cumulative impacts analysis assesses the impacts that result from the proposed project's incremental effect viewed over time. The impact of GHG emissions caused by this solar facility is characterized by considering how the power plant would affect the overall electricity system. The integrated electricity system depends on non-fossil and fossil-fueled generation resources to provide energy and satisfy local capacity needs. As directed by the Energy Commission's adopted order initiating an informational (OII) proceeding (08-GHG OII-1) (CEC 2009a), staff is refining and implementing the concept of a "blueprint" that describes

[20] The GHG displacement for the project would be similar to, but not exactly the same as, the amount of energy produced after energy payback is achieved multiplied by the average GHG emissions per unit of energy displaced. The average GHG emissions for the displaced energy over the project life is not known but currently fossil fuel fired power plants have GHG emissions that range from 0.35 MT/MWh CO2E for the most efficient combined cycle gas turbine power plants to over 1.0 MT/MWh for coal fired power plants.

[21] The footprint of the main site area is just less than 3,000 acres, but the total area that would be disturbed by the project, even if not permanently disturbed or require complete removal of vegetation, including drainage features and linear right of ways is approximately 4,000 acres.

the long-term roles (i.e., retirements and displacement) of fossil-fueled power plants in California's electricity system as we move to a high-renewable, low-GHG electricity system, which will include projects like PSPP.

PROPOSED PROJECT

Construction Impacts

Staff concludes that the GHG emission increases from construction activities would not be CEQA significant for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the proposed project. Second, best practices control measures that staff recommends, such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since the use of newer equipment would increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. And lastly, these temporary GHG emissions are necessary to create this renewable energy source that would provide power with a very low GHG emissions profile, and the construction emissions would be more than offset by the reduction in fossil fuel–fired generation that would be enabled by this proposed project. If the project construction emissions were distributed over the estimated 30-year life of the proposed project they would only increase the project life time annual facility GHG emissions rate by 0.0034 MT CO2E per MWh.

Direct/Indirect Operation Impacts and Mitigation

The proposed PSPP promotes the state's efforts to move towards a high-renewable, low-GHG electricity system, and, therefore, reduces both the amount of natural gas used by electricity generation and greenhouse gas emissions.

Net GHG emissions for the integrated electric system will decline when new renewable power plants are added to: 1) move renewable generation towards the 33% target; 2) improve the overall efficiency, or GHG emission rate, of the electric system; and 3) serve load growth or capacity needs more efficiently, or with fewer GHG emissions.

The Role of PSPP in Renewables Goals/Load Growth

As California moves towards an increased reliance on renewable energy by implementing the Renewables Portfolio Standard (RPS), non-renewable energy resources will be displaced. These reductions in non-renewable energy, shown in **Greenhouse Gas Table 4**, are targeted to be as much as 36,500 GWh. These assumptions are conservative in that the forecasted growth in electricity retail sales assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already embodied in the current retail sales forecast.[22] Energy Commission staff estimates that as much as

[22] Energy efficiency savings are already represented in the current Energy Commission demand forecast adopted December 2009 (CEC 2009c).

18,000 GWh of additional savings due to uncommitted energy efficiency programs may be forthcoming.[23] This would reduce non-renewable energy needs by a further 12,000 GWh given a 33% RPS.

Greenhouse Gas Table 4
Estimated Changes in Non-Renewable Energy Potentially Needed to Meet California Loads, 2008-2020

California Electricity Supply	**Annual GWh**	
Statewide Retail Sales, 2008, actual[1]	264,794	
Statewide Retail Sales, 2020, forecast[1]	289,697	
Growth in Retail Sales, 2008-20	24,903	
Growth in Net Energy for Load[2]	29,840	
California Renewable Electricity	**GWh @ 20% RPS**	**GWh @ 33% RPS**
Renewable Energy Requirements, 2020[3]	57,939	95,600
Current Renewable Energy, 2008	29,174	
Change in Renewable Energy-2008 to 2020	28,765	66,426
Resulting Change in Non-Renewable Energy	176	(36,586)

Notes:
1 - 2009 IPER Demand Forecast, Form 1.1c. Excludes pumping loads for entities that do not have an RPS.
2 - 2009 IEPR Demand Forecast, Form 1.5a.
3 - RPS requirements are a percentage of retail sales.
Source: Energy Commission staff 2010.

The Role of PSPP in Retirements/Replacements

PSPP would be capable of annually providing 1,000 GWh of renewable generation energy to replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting facilities such as coal-fired generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007). Some of the existing plants that are likely to require substantial capital investments to continue operation in light of these policies may be unlikely to undertake the investments and will retire or be replaced.

Replacement of High GHG-Emitting Generation

High GHG -emitting resources, such as coal, are effectively prohibited from entering into new long-term 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 5**.

[23] See *Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast* (CEC-200-2010-001-D, January, 2010), page 2. Table 1 indicates that additional conservation for the three investor-owned utilities may be as high as 14,374 GWh. Increasing this value by 25% to account for the state's publicly-owned utilities yields a total reduction of 17,967 GWh.

Greenhouse Gas Table 5
Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020

Utility	Facility[1]	Contract Expiration	Annual GWh Delivered to California
PG&E, SCE	Misc In-state Qualifying Facilities[1]	2009-2019	4,086
LADWP	Intermountain	2009-2013	3,163 [2]
City of Riverside	Bonanza, Hunter	2010	385
Department of Water Resources	Reid Gardner	2013 [3]	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**

Notes:
1 - All facilities are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.
2 - Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
3 - Contract not subject to Emission Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.
Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.

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,[24] all the coal contracts (including those in **Greenhouse Gas Table 5**, 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 uncompetitive due to the carbon adder or the capital needed to capture and sequester the carbon emissions. Also shown are the approximate 500 MW of in-state coal and petroleum coke-fired capacity that may be unlikely to contract with California utilities for baseload energy due to the SB1368 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 such as this proposed project; some will come from new and existing natural gas fired generation. All of these new facilities will have substantially lower GHG emissions rates than coal and petroleum coke-fired facilities which typically averages about 1.0 $MTCO_2$/MWh without carbon capture and sequestration. Thus, new renewable facilities will result in a net reduction in GHG emissions from the California electricity sector.

Retirement of Generation Using Once-Through Cooling

The State Water Resource Control Board (SWRCB) has proposed major changes to once-through cooling (OTC) units, shown in **Greenhouse Gas Table 6**, which would likely require extensive capital to retrofit, or retirement, or substantial curtailment of dozens of generating units. In 2008, these units collectively produced almost 58,000 GWh. While the more recently built OTC facilities may well install dry or wet cooling towers and continue to operate, the aging OTC plants are not likely to be retrofit to use

[24] 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.

dry or wet cooling towers without the power generation also being retrofit or replaced to use a more efficient and lower GHG emitting combined cycle gas turbine technology. Most of these existing OTC units operate at low capacity factors, suggesting a limited ability to compete in the current electricity market. Although the timing would be uncertain, new resources would out-compete aging plants and would displace the energy provided by OTC facilities and likely accelerate their retirements.

Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced. These units constitute over 15,000 MW of merchant capacity and 17,800 GWh of merchant energy. Of this, much but not all of the capacity and energy are in local reliability areas, requiring a large share of replacement capacity – absent transmission upgrades – to locations in the same local reliability area. **Greenhouse Gas Table 6** provides a summary of the utility and merchant energy supplies affected by the OTC regulations.

New renewable generation resources will emit substantially less GHG emissions on average than other energy generation sources. Existing aging and OTC natural gas facility generation typically averages 0.6 to 0.7 $MTCO_2$/MWh, which is much less efficient, higher GHG emitting, than a renewable energy project like PSPP. A project like PSPP, located far from the coastal load pockets like the Los Angeles Local Reliability Area (LRA), would more 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. Regardless, due to its low greenhouse gas emissions, PSPP would serve to reduce GHG emissions from the electricity sector.

Closure and Decommissioning

Eventually the facility would close, either at the end of its useful life or due to some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease to operate and thus impacts associated with those greenhouse gas emissions would no longer occur. The only other expected, albeit temporary, GHG emissions would be equipment exhaust (off-road and on-road) from dismantling activities. These activities would be of much a shorter duration than construction of the proposed project, equipment used to dismantle the facility are 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. It is assumed that the beneficial GHG impacts of this facility, displacement of fossil fuel–fired generation, would be replaced by the construction of newer more efficiency renewable energy or other low GHG generating technology facilities. Also, the recycling of the facility components (steel, concrete, etc.) could indirectly reduce GHG emissions from decommissioning activities. Therefore, while there would be temporary adverse greenhouse gas CEQA impacts during decommissioning they are determined to be less than significant.

Greenhouse Gas Table 6

Aging and Once-Through Cooling Units: 2008 Capacity and Energy Output[1]

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2008 Energy Output (GWh)	GHG Emission Rate ($MTCO_2/MWh$)
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[2]	Utility	L.A. Basin	Yes	75	90	0.648
El Centro 3, 4[2]	Utility	None	Yes	132	238	0.814
Grayson 3-5[2]	Utility	LADWP	Yes	108	150	0.799
Grayson CC[2]	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	Utility	LADWP	No	560	3,423	0.376
Humboldt Bay 1, 2[1]	Utility	Humboldt	Yes	107	507	0.683
Olive 1, 2[2]	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[2]	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[2]	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**	

Notes:
1 - 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.
2 - Units are aging but are not OTC.
Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.

RECONFIGURED ALTERNATIVE

Reconfigured Alternative includes the reconfigured Unit #1 and #2. The setting for this alternative would not change from that for the proposed project. The reconfigured Unit #1 and #2 would use approximately 180 acres more land than the proposed Unit #1 and #2 which were located on 1,380 acres each. Approximately 240 acres of reconfigured Unit #1 would be outside of the PSPP Right of Way application area but the alternative would remain entirely within BLM managed lands. The Reconfigured Alternative is shown in **Alternatives Figure 1**.

The Reconfigured Alternative would essentially require the same amount of total construction and have the same operating emission sources and maintenance requirements as the proposed project. Therefore, the GHG emissions from construction and operation are similar to that presented for the proposed project in **Greenhouse Gas Tables 2** and **3**.

If the Reconfigured Alternative were approved essentially the same direct GHG emission impacts of the proposed project and the same indirect benefits of the proposed project from displacing fossil fuel–fired generation and reducing associated greenhouse gas emissions from gas-fired generation would occur.

REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be approximately 25% smaller, occupying about 2080 acres of land (as compared with 2,740 acres required for the proposed project). The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**. The Reduce Acreage Alternative would result in an approximately 375 MW project, which is 75% of the proposed project's generating capacity. This alternative is analyzed for several reasons: (1) it would eliminate about 25% of the proposed project area so all impacts would be reduced; (2) it would reduce impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley aeolian sand corridor, and the Mojave Fringe-Toed Lizard by prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields; (3) it would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 2; and (4) it would reduce impacts to primary and secondary desert washes crossing the proposed site. The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**.

This alternative eliminates 125 MW of solar field from the proposed project. The transmission lines, road access, and gas pipeline requirement would remain approximately the same length as for the proposed project. The linear construction would require minor adjustments to accommodate the modified layout.

The Reduced Acreage Alternative would reduce the total construction GHG emissions of the proposed project (see **Greenhouse Gas Tables 2** and **3**) by somewhat less than 25%, and operation GHG emissions by somewhat less than 25%, due to lower efficiencies of the smaller project size.

The results of the Reduced Acreage Alternative would be the following:

- The impacts of the proposed project would not occur on the lands not used due to the smaller project size. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project.
- The benefits of the proposed project in displacing fossil fuel–fired generation and reducing associated greenhouse gas emissions from gas-fired generation would be slightly reduced. Both State and Federal law support the increased use of renewable power generation.

If the Reduced Acreage Alternative were approved, other renewable projects may be developed that would compensate for the loss of generation compared to the proposed project on other sites in the SCAQMD, the MDAB, or in adjacent states as developers strive to fill the 125 MW gap not supplied by the proposed project to provide renewable power that complies with utility requirements and State/Federal mandates.

RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres (Solar Millennium 2010l).

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

The Reconfigured Alternative #2 would essentially require the same amount of total construction and have the same operating emission sources and maintenance requirements (with perhaps slightly more maintenance emissions due to a less efficient layout) as the proposed project. Therefore, the GHG emissions from construction and operation are similar to that presented for the proposed project in **Greenhouse Gas Tables 2** and **3**.

If the Reconfigured Alternative #2 were approved essentially the same direct GHG emission impacts of the proposed project, and the same indirect benefits of the proposed project from displacing fossil fuel-fired generation and reducing associated greenhouse gas emissions from gas-fired generation would occur.

RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the

proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres (Solar Millennium 2010l).

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

The Reconfigured Alternative #3 would essentially require the same amount of total construction and have the same operating emission sources and maintenance requirements (with perhaps slightly more maintenance emissions due to a less efficient layout) as the proposed project. Therefore, the GHG emissions from construction and operation are similar to that presented for the proposed project in **Greenhouse Gas Tables 2** and **3**.

If the Reconfigured Alternative #3 were approved essentially the same direct GHG emission impacts of the proposed project, and the same indirect benefits of the proposed project from displacing fossil fuel-fired generation and reducing associated greenhouse gas emissions from gas-fired generation would occur.

NO ACTION ALTERNATIVES

No Action on Proposed Project Application and on CDCA Land Use Plan Amendment

Under this alternative, the proposed project would not be approved by the CEC and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

The results of this alternative would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another renewable energy project.
- The benefits of the proposed project in displacing fossil fuel–fired generation and reducing associated greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation.

If the proposed project is not approved, renewable projects would likely be developed on other sites in the SCAQMD, the MDAB, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, there are several pending solar and wind projects in the Palen

area and along the I-10 corridor including two thermal solar projects, the Blythe Solar Power Project and Genesis Solar Energy Project siting cases, which are currently being evaluated by the Energy Commission and BLM. Additionally, there are dozens of other wind and solar projects that have applications pending with BLM in the California Desert District.

No Action on Proposed Project and Amend the CDCA Land Use Plan to Make the Area Available for Future Solar Development

Under this alternative, the proposed project would not be approved by the CEC and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, GHG emissions would result from the construction and operation of the solar technology and would likely be similar to the GHG emissions from the proposed project. Different solar technologies require different amounts of construction and operations maintenance; however, it is expected that all the technologies would provide the more significant benefit, like the proposed project, of displacing fossil fuel–fired generation and reducing associated GHG emissions. As such, this No Project/No Action Alternative could result in GHG benefits similar to those of the proposed project.

No Action on Proposed Project Application and Amend the CDCA Land Use Plan to Make the Area Unavailable for Future Solar Development

Under this alternative, the proposed project would not be approved by the CEC and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the greenhouse gas emissions from the site, including carbon uptake, is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in the GHG benefits from the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

PROJECT-RELATED FUTURE ACTIONS

The proposed project and the project alternatives would require the construction of the Red Bluff Substation to connect the site to the Devers-Palo Verde transmission corridor. The construction of the Red Bluff Substation would cause construction related GHG emissions and minor operation inspection and maintenance related GHG emissions, both from inspection vehicle mobile source emissions and stationary source emissions

from onsite equipment (emergency power generator engine and electrical equipment leaks of SF_6). However, the magnitude of these construction and operation emissions are minimal in comparison to the GHG emissions reductions that would be caused by the proposed project or project alternatives, so this project-related future action does not affect staff's greenhouse gas significance impact findings for the proposed project or project alternatives.

CUMULATIVE IMPACTS

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.

This entire assessment is a cumulative impact assessment. The proposed project alone would not be sufficient to change global climate, but would emit greenhouse gases and therefore has been analyzed as a potential cumulative impact in the context of existing GHG regulatory requirements and GHG energy policies.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The PSPP, 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).

The PSPP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

Since the proposed project would have emissions that are below 25,000 MT/year of CO2E, the proposed project would not be subject to federal mandatory reporting of greenhouse gases. The proposed project would also not be subject to the federal air quality permitting requirements of the new PSD and Title V Tailoring Rule that has a CO2E emissions trigger of 100,000 tons per year. Additionally, it would also be exempt from the state's greenhouse gas reporting requirements.

NOTEWORTHY PUBLIC BENEFITS

Greenhouse gas related noteworthy public benefits include the construction of renewable and low-GHG emitting generation technologies and the potential for successful integration

into the California and greater WECC electricity systems. Additionally, the PSPP project would contribute to meeting the state's AB 32 goals.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received several climate change comments from the United States Environmental Protection Agency (U.S. EPA 2010b). Only one of these comments is within the scope of the analysis of this section.

U.S. EPA 2010b, Page 7

Briefly discuss the climate change benefits of solar energy. We suggest quantifying the greenhouse gas emissions that would be produced by other types of electric generating facilities (solar, geothermal, natural gas, coal-burning, and nuclear) generating comparable amounts of electricity, and compiling and comparing these values.

Response: This section already includes a discussion of the benefit of solar energy, including information regarding the comparatively low direct GHG emissions from this solar energy project, and also provides general and plant specific GHG emission values for both natural gas and coal fossil fuel-fired generation facilities. However, in order to consolidate and expand the following approximate range of direct operating emission rates (MT CO_2/MWh) are presented in descending order for comparison[25,26]:

- Thermal solar energy – 0.005 to 0.03 MT CO_2/MWh (PSPP – 0.015 CO_2/MWh)
- Geothermal energy - 0.023 MT CO_2/MWh (CAT 2007) for traditional steam extraction technology to 0.12 MT CO_2/MWh[27] for brine extraction and flash technology.
- Natural gas combined cycle turbines – 0.35 to 0.40 MT CO_2/MWh
- Natural gas boilers – 0.55 to 0.6 MT CO_2/MWh
- Natural gas simple cycle turbines – 0.5 to 1.0 MT CO_2/MWh
- Coal fired power plants[28] (without carbon sequestration) – approximately 1.0 MT CO_2/MWh.

The Energy Commission is currently working on determining a standardized methodology for determining the GHG emission reductions from renewable energy, but other existing methods generally range from 0.35 to 0.40 MT CO_2/MWh. The 2006 California Climate Action Team proposed an avoided emissions value of 0.39 MT CO_2/MWh (CAT 2007). Using this value and neglecting transmission loss differences

[25] These emission rates are based on Energy Commission staff experience from recent siting cases unless otherwise referenced.

[26] Nuclear is not considered a relevant technology comparison as new nuclear power is not considered viable in the State of California and new imports from new out of state nuclear facilities are highly speculative.

[27] From a currently unpublished staff analysis of the Black Rock 1,2, and 3 Geothermal Power Project.

[28] It should be noted that in the State of California due to the requirements of SB 1368 coal plant emissions are not included in the determination of average avoided GHG emissions for renewable energy, which is instead based either on combined cycle gas turbine plant emissions or a mix of combined cycle natural gas plant emissions with a small amount of simple cycle gas turbine emissions as the avoided power base line.

and other minor adjustment factors, such as annualized construction emissions and CO_2 uptake loss, the avoided GHG emissions minus the direct PSPP GHG emissions benefit would total 375,000 tons of CO_2 per year.

CONCLUSIONS

The PSPP would emit considerably less greenhouse gases (GHG) than existing power plants and most other generation technologies, and thus would contribute to continued improvement of the overall western United States, and specifically California, electricity system GHG emission rate average. The proposed project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff concludes that the proposed project's operation would result in a cumulative overall reduction in GHG emissions from the state's power plants that would create a beneficial effect under CEQA, would not worsen current conditions, and would thus not result in CEQA impacts that are cumulatively significant.

Staff concludes that the GHG emission increases typical from construction and decommissioning activities would not be CEQA significant for several reasons. First, the periods of construction and decommissioning would be short-term and not ongoing during the life of the proposed project. Second, the best practices control measures that staff recommends, such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since the use of newer equipment would increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. Finally, the construction and decommissioning emissions are miniscule when compared to the reduction in fossil fuel power plant greenhouse gas emissions during project operation. For all these reasons, staff would conclude that the short-term emission of greenhouse gases during construction would be sufficiently reduced and would be offset during proposed project operations and would, therefore, not be CEQA significant.

The PSPP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

MITIGATION MEASURES/PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to project greenhouse gas emissions are proposed because the proposed project would create beneficial GHG impacts. The project owner would have to comply with any future applicable GHG regulations formulated by the ARB or the U.S.EPA, such as GHG reporting or emissions cap and trade markets.

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ACRONYMS

ARB	California Air Resources Board
CalEPA	California Environmental Protection Agency
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO2E	Carbon Dioxide Equivalent
CPUC	California Public Utilities Commission
EIR	Environmental Impact Report
EPS	Emission Performance Standard
GCC	Global Climate Change
GHG	Green House Gas
GWh	Gigawatt-hour
HFC	Hydrofluorocarbons
IEPR	Integrated Energy Policy Report
IGCC	Integrated Gasification Combined Cycle
LADWP	Los Angeles Department of Water and Power
LRAs	Local Reliability Areas
MT	Metric tonnes
MW	Megawatts
MWh	Megawatt-hour
N_2O	Nitrous Oxide
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_3	Nitrates
NOx	Oxides of Nitrogen or Nitrogen Oxides
OII	Order Initiating an Informational
OTC	Once-Through Cooling
PFC	Perfluorocarbons
PSD	Prevention of Significant Deterioration
PSPP	Palen Solar Power Project
QFER	Quarterly Fuel and Energy Report
RPS	Renewables Portfolio Standard
SB	Senate Bill
SF_6	Sulfur hexafluoride
SWRCB	State Water Resource Control Board
WECC	Western Electricity Coordinating Council

C.2 BIOLOGICAL RESOURCES

The Biological Resources Section will be included in the Revised Staff Assessment, Part 2.

C.3 CULTURAL RESOURCES AND NATIVE AMERICAN VALUES

The Cultural Resources Section will be included in the Revised Staff Assessment, Part 2.

C.4 HAZARDOUS MATERIALS MANAGEMENT

The Hazardous Materials Management Section will be included in the Revised Staff Assessment, Part 2.

C.5 – HEALTH AND SAFETY

Testimony of Alvin Greenberg, Ph.D.

C.5.1 SUMMARY OF CONCLUSIONS

Energy Commission staff (hereafter jointly referred to as staff) have analyzed potential public health and safety risks associated with construction and operation of the Palen Solar Power Project (PSPP) and does not expect there would be any significant adverse cancer, or short - or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed and alternative site configurations of the PSPP was based on a conservative health protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from PSPP would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

C.5.2 INTRODUCTION

The purpose of this Revised Staff Assessment (RSA) is to determine if emissions of toxic air contaminants (TACs) from the proposed PSPP project would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

In addition to the analysis contained in this Public Health and Safety Section that focuses on potential effects to the public from emissions of toxic air contaminants, other related aspects to the assessment of potential public health and safety impacts from PSPP are considered elsewhere in this document as listed and briefly described below:

- Air Quality - evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the PSPP 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;
- Hazardous Materials Management - evaluates the potential impacts on public and worker health from accidental releases of hazardous materials;
- Socioeconomics and Environmental Justice - evaluates project-induced changes on community services including law enforcement and hospitals;
- Soil and Water Resources - evaluates the potential for PSPP to cause contamination of soil and water resources, to exacerbate flooding, and to cause adverse effects to water supply in consideration of other existing users and projected needs;

- Transmission Line Safety and Nuisance - evaluates potential effects associated with proposed transmission lines accounting for both the physical presence of the lines and the physical interactions of their electric and magnetic fields; The potential effects include aviation safety, interference with radio-frequency communication, audible noise, fire hazards, hazardous shocks, nuisance shocks, and electric and magnetic field (EMF) exposure.
- Worker Safety and Fire Protection - assess the worker safety and fire protection measures proposed by the applicant including determining whether the project would have any adverse impacts on fire protection and emergency medical services that are also relied upon by the public;
- Waste Management - evaluates issues associated with wastes generated from the proposed project construction and operation including ensuring that wastes would be managed in an environmentally safe manner.

C.5.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The analysis of proposed project effects must comply with both CEQA and NEPA requirements given the respective power plant licensing and land jurisdictions of the California Energy Commission and U.S. Bureau of Land Management (BLM). CEQA requires that the significance of individual effects be determined by the Lead Agency; however, the use of specific significance criteria is not required under NEPA.

Because this document is intended to meet the requirements of both NEPA and CEQA, the methodology used for determining environmental impacts of the proposed project includes a consideration of guidance provided by both laws.

CEQA requires a list of criteria that are used to determine the significance of identified impacts. A significant impact is defined by CEQA as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project” (State CEQA Guidelines Section 15382).

In comparison, the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR Part 1500 - 1508) states that “‘Significantly’ requires considerations of both context and intensity…” (40 CFR 1508.27). Therefore, thresholds serve as a benchmark for determining if a project action will result in a significant adverse environmental impact when evaluated against the baseline. The CEQ Regulations requires that an Environmental Impact Statement (EIS) is prepared when the proposed federal action (project) as a whole has the potential to “significantly affect the quality of the human environment.”

Thresholds for determining significance in this section are based on Appendix G of the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by the Energy Commission staff. In addition, staff’s evaluation of the environmental effects of the proposed project on land uses (i.e., those listed below) includes an assessment of the context and intensity of the impacts, as defined in the NEPA implementing regulations 40 CFR Part 1508.27.

Effects of the proposed project on the land use environment (and in compliance with both CEQA and NEPA) have been determined using the thresholds listed below.

The **Public Health** section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no ambient air quality standards have been established are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment consists of the following steps:

- identify the types and amounts of hazardous substances that PSPP could emit to the environment;
- estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
- estimate amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact; and
- characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff relies upon the expertise of the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) to identify contaminants that are known to the state to cause cancer or other noncancer toxicological endpoints and to calculate the toxicity and cancer potency factors of these contaminants. Staff also relies upon the expertise of the California Air Resources Board and the local air districts to conduct ambient air monitoring of toxic air contaminants and the state Department of Public Health to conduct epidemiological investigations into the impacts of pollutants on communities. It is not within the purview or the expertise of the Energy Commission staff to duplicate the expertise and statutory responsibility of these agencies.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case, risks and then using those conditions in the study. Such conditions include:

- using the highest levels of pollutants that could be emitted from the 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).

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The risk assessment process for this project addresses two categories of health impacts: chronic (long-term) noncancer effects, and cancer risk (also long-term). Since the only TAC emitted from this project would be diesel particulate from emergency diesel-fueled engines, and since only long-term health effects have been established for diesel particulate, no acute (short-term) health effects are calculated for this project.

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 12% to 100% of a lifetime, or from 8 to 70 years (OEHHA 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called *Reference Exposure Levels*, or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The Reference Exposure Levels are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number 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 (called *potency factors* and established by OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks.

Significance Criteria

Energy Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, noncriteria pollutants for this project are evaluated for long-term (chronic) noncancer health effects as well as cancer (long-term) health effects. The significance of project health impacts is determined separately for each of these categories.

Chronic Noncancer Health Effects

Staff assesses the significance of noncancer health effects by calculating a *hazard index*. A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than 1.0 signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a Total Hazard Index. A Total Hazard Index of less than 1.0 indicates that cumulative worst-case exposures are less than the

reference exposure levels. Under these conditions, health protection from the project is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant noncancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, (Health & Safety Code, §§25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations section 12703(b) states that "the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure." This level of risk is equivalent to a cancer risk of 10 in 1 million, which is also written as 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that applied by Proposition 65. The significant risk level of 10 in 1 million is consistent with the level of significance adopted by the South Coast Air Quality Management District (SCAQMD) in Rule 1401 (Solar Millennium 2009a, Section 5.10.1.3).

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. Staff's analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants and any minority or low-income populations that are likely to be disproportionately affected by impacts. To accomplish this goal, staff uses the most current acceptable public health exposure levels set to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. Based on refined assumptions, if risk posed by the facility exceeds the significance level of 10 in 1 million, staff would require appropriate measures to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than 10 in 1 million, staff would deem such risk to be significant and would not recommend project approval.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Public Health Table 1

Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	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.

Applicable Law	Description
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 Health and Safety Code Sections 44300 et seq.	Air Toxics Hot Spots Program requires participation in the inventory and reporting program at the District level.
California Health and Safety Code Sections 44360 - 44366	Air Toxics Hot Spots Information and Assessment Act requires that based on results of an HRA conducted per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels.
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	
South Coast Air Quality Management District (SCAQMD) Rule 402	Prohibits the discharge of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to the public; endanger the comfort, repose, health or safety of the public; or cause injury or damage to business or property.
SCAQMD Rule 1401	Discusses new source review for air toxics; specifies limits for maximum individual cancer risk, cancer burden, and noncancer acute and chronic hazard index from new permit units, relocations, or modifications to existing permit units which emit toxic air contaminants listed in Table I of the rule.
SCAQMD Rule 1470	Establishes fuel requirements, operating requirements and emission standards for stationary diesel-fueled internal combustion engines greater than 50 brake-horsepower.

C.5.4 PROPOSED PROJECT

C.5.4.1 SETTING AND EXISTING CONDITIONS

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas, due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn,

affects public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality, existing public health concerns, and environmental site contamination.

Site and Vicinity Description

The proposed facility would be located in the Colorado Desert portion of eastern Riverside County, approximately 10 miles east of Desert Center and about 0.5 miles north of Interstate 10. Lands in the vicinity of the project consist predominantly of open desert and agricultural lands. The topography of the site is mostly flat (ranges between 130 and 200 feet above sea level), with elevated terrain beginning to the northeast and southwest within 3-4 miles of the site (Solar Millennium 2009a, Section 2.4.1). Alternative site layouts were also evaluated (Solar Millennium 2010l)

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. There are no sensitive receptors within a 3-mile radius of the project site. The nearest sensitive receptor is the Eagle Mountain Elementary School located about 10 miles west of the project site. There are two residences within 1 mile of the project site, located about 25 feet and 3,500 feet northwest of the project fenceline, respectively (Solar Millennium 2009a, Section 5.10.2 and Figure 5.10-2).

Meteorology

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

This region of Riverside County (part of the Colorado Desert) is characterized by a dry-hot desert climate; summers are hot and dry, winters are moderate with low precipitation, and temperature inversions are strong. The region typically experiences clear skies, two rainy seasons (in winter and late summer), and strong seasonal winds. Winds generally flow from the west and southwest across the region and tend to transport air pollutants from the Los Angeles area into the Mojave Desert Air Basin (MDAB), in which the project is located (Solar Millennium 2009a, section 5.2.2.1).

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

Existing Air Quality

The proposed site is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD), although it is part of the MDAB. By examining average toxic

concentration levels from representative air monitoring sites in the project vicinity with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual in the United States from all causes is about 1 in 3, or 333,000 in 1 million. For the year 2004, the American Cancer Society estimated that the death rate due to cancer was 23.1%, about 1 in 4.

There are no monitoring stations within the MDAB that measure TACs, and therefore the background cancer risk in the MDAB cannot be determined. The nearest California Air Resources Board (CARB) air toxics monitoring station that actively reports values is located in Calexico, approximately 70 miles south of the project site. Although staff does not consider this location to be representative of air quality in the area of the proposed site, it serves to show the upper-bound levels of toxic air contaminants found in the region. In 2008, the background cancer risk calculated by CARB for the Calexico monitoring station was about 135 in 1 million (CARB 2009). The pollutants 1,3-butadiene and benzene, emitted primarily from mobile sources, accounted together for more than half of the total risk. The risk from 1,3-butadiene was about 43 in 1 million, while the risk from benzene was about 44 in 1 million. Formaldehyde accounts for about 13% of the 2008 average calculated cancer risk based on air toxics monitoring results, with a risk of about 18 in 1 million. Formaldehyde is emitted directly from vehicles and other combustion sources, such as the proposed facility. The risk from hexavalent chromium was about 14 in 1 million, or ~10% of the total risk.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk in all areas of California during the past few years. For example, in one large air district, cancer risk was 342 in 1 million based on 1992 data and in 2002, the average inhalation cancer risk decreased to 162 in 1 million (BAAQMD 2004, p. 12). Similar reductions occurred throughout the state's major metropolitan areas.

Existing Public Health Concerns

When evaluating a new project, staff sometimes conducts a study and analysis of existing public health issues in the project vicinity. This analysis is prepared in order to identify the current status of respiratory diseases (including asthma), cancer, and childhood mortality rates in the population located near the proposed project, which provides a basis on which to evaluate the significance of any additional health impacts from the proposed project. Because of the very low population in the immediate vicinity of the project and no existing health concerns within a 6-mile radius of the project have been identified by the applicant or the air district (with the exception of the Multiple Air Toxics Exposure Study (MATES) conducted for the South Coast Air Basin, which do not represent the project site (Solar Millennium 2009a, Section 5.10.2), staff did not conduct an analysis of existing public health issues because no data exists.

Environmental Site Contamination

Site disturbances occur during demolition of existing structures, facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of

airborne dust, material being carried off-site through soil erosion, and uncovering buried hazardous substances. The Phase I Environmental Site Assessment conducted for this site in 2009 found no "Recognized Environmental Conditions" per the American Society for Testing and Materials Standards (ASTM) definition. That is, there was no evidence or record of any use, spillage, or disposal of hazardous substances on the site, nor was there any other environmental concern that would require remedial action (Solar Millennium 2009a, Section 5.16.2.3).

To address the possibility that soil contamination would be encountered during construction of the PSPP, proposed Conditions of Certification **WASTE-1** and **WASTE-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. Staff believes that adherence to current ordinances and to staff's proposed Conditions of Certification mentioned above will be adequate to address any soil or groundwater contamination that may exist on this site. See the staff assessment section on **Waste Management** for a more detailed analysis of this topic.

C.5.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction Impacts and Mitigation

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation (discussed in the "Setting" section above), as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants.

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased cough, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel (SRP) on Toxic Air Contaminants recommended a chronic REL (see REL discussion in Method of Analysis section above) for diesel exhaust particulate matter of 5 $\mu g/m^3$ and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6). [The SRP, established pursuant to

California Health and Safety Code section 39670, evaluates the risk assessments of substances proposed for identification as Toxic Air Contaminants by ARB and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based.] The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of the PSPP, including site preparation, is anticipated to take place over a period of 39 months (Solar Millennium 2009a, Section 2.5.7.1). As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from 8 to 70 years.

Tables DR-AIR-4-1 and DR-AIR-4-2 of the applicant's responses to data requests (AECOM 2010a) present maximum daily and annual emissions from construction activities including fugitive dust and diesel exhaust. In response to Data Request #172, the applicant conducted a health risk assessment for diesel particulate matter (DPM) from construction equipment emissions. The applicant estimated that 33,058 pounds of DPM would be emitted during the entire construction period of about 3.3 years. In order to model the cancer risk from construction emissions, the applicant divided the total amount of DPM by the exposure period of 70 years which is typically used to assess health risks. The applicant's modeling of worst-case construction emissions (using a 100-meter spacing receptor grid) found that the cancer risk was estimates to be 3.3 in 1 million at the point of maximum impact (PMI), below the level of significance of 10 in 1 million. The chronic hazard index was found to be 0.0021 at the PMI, below the level of significance of 1.0. The PMI was located along the northern site boundary in a remote area that is part of the project right-of-way and not frequently accessed by the public (AECOM 2010a, DR-PH-172).

Since preparing the above construction HRA, the applicant modified the project to include a concrete batch plant and a fuel depot during the construction phase of the project, and changes were also made to the construction schedule. The operation of the concrete batch plant would result in increased diesel exhaust and fugitive dust emissions during construction as summarized in Appendix C of the applicant's engineering changes (Galati & Blek 2010i). The diesel storage tanks at the proposed fuel depot would also contribute TAC emissions as summarized in Appendix A and Appendix D of the applicant's engineering changes (Galati & Blek 2010i). The applicant has revised the Air Quality modeling for construction criteria emissions to reflect these changes; however, the construction HRA which assesses health risks from non-criteria pollutants has not been revised. The applicant stated that the increased construction emissions associated with the proposed changes would not significantly contribute to public health impacts.

Mitigation measures are proposed by both the applicant and Air Quality staff to reduce the maximum calculated PM10 as well as PM2.5 concentrations. These include the use of extensive fugitive dust control measures that are assumed to result in 90% reduction of fugitive dust emissions. In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, the use of

ultra low-sulfur diesel fuel is now required and the installation of an oxidation catalyst and soot filters on diesel equipment is recommended. The catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85% to 92%. Such filters will reduce diesel emissions during construction and further reduce the impacts associated with diesel exhaust. (See the **Air Quality** section of this RSA for staff's proposal to control particulate matter.)

Operation Impacts and Mitigation

Emissions Sources

The emissions sources at the proposed PSPP site include two propane-fired auxiliary boilers, two small wet cooling towers used for ancillary equipment, two diesel-fueled emergency generators, two diesel-fueled emergency fire pumps, two HTF expansion/ ullage systems, and DPM from maintenance vehicles.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility. Table 5.10-4 of the AFC lists toxic air contaminants that may be emitted by the project along with the toxicity values used to calculate their health effects. Toxicity values include RELs which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the California Environmental Protection Agency Office of Health Hazard Evaluation (OEHHA) Guidelines (OEHHA 2003). **Public Health Table 2** lists toxic emissions expected from the PSPP and shows how each contributes to the health risk analysis.

Public Health Table 2
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Arsenic	✔	✔	✔	✔	✔
Benzene			✔	✔	✔
Biphenyl**					
Chloroform		✔	✔	✔	
Chromium (Hexavalent)			✔	✔	✔
Dichlorobenzene			✔	✔	
Diesel Exhaust			✔	✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Manganese				✔	
Naphthalene		✔	✔	✔	
Polycyclic Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	
Toluene				✔	✔
Zinc*					

Source: OEHHA 2003 Appendix L and Solar Millennium 2009a, Table 5.10-4 and Table DR-PH-178-1 (AECOM 2010a).
*No cancer risk factors or RELs have been established for biphenyl and zinc.

Appendix E.3 and Tables 5.10-5 through 5.10-8 of the AFC lists non-criteria pollutants and their emission factors that may be emitted from the sources listed above (Solar Millennium 2009a). Emission factors for most plant components were obtained from the U.S. EPA emission factors database (AP-42) and the California Air Toxics Emission Factors (CATEF II) database. Data from existing solar plants was used to estimate emissions from the HTF expansion tanks, which consist of benzene (calculated as 99.99%) and biphenyl (calculated as 0.01%). Since biphenyl has not been assigned a health risk factor, it was not included in the HRA calculations (Solar Millennium 2009a, Section 5.10.3.2).

In response to Data Request 176, the applicant stated that VOC emissions from the HTF expansion tank are estimated to be 137 pounds per MW per year, based on comparable thermal solar projects and on an operational mass balance for the ullage system developed by the applicant's solar design engineer. In regards to the composition of VOC emissions from the HTF expansion tank, the applicant notes that HTF breakdown products may include benzene, toluene, xylene, phenol, naphthalene, methane, ethane, benzenol, and biphenyl. In the revised health risk assessment conducted for this project in response to Data Request 174, the applicant modeled the entire amount of HTF emissions as benzene since it is the compound with the highest risk factors for cancer and non-cancer effects (AECOM 2010a, DR-PH-176).

In response to Data Requests 173 and 175, the applicant provided total daily and yearly DPM emissions from maintenance vehicles and total cumulative daily and yearly PM2.5 emissions including both fugitive dust and DPM. The total DPM emissions from maintenance vehicles were estimated to be 3.8 pounds per year and the total PM2.5 emissions were estimated to be 7,767 pounds per year. DPM emissions are therefore negligible when compared to non-exhaust emissions, the majority of which (over 80%) is attributed to mirror washing trucks (AECOM 2010a). The estimated DPM emissions from maintenance vehicles were added to the applicant's revised health risk assessment.

Since the PSPP project intends to use groundwater for cooling, the potential exists for TACs present in the water to disperse into the air via cooling tower drift (these cooling towers are used for ancillary equipment only). In response to Data request 178, the applicant conducted water sampling and analysis of the on-site well water for VOCs, petroleum hydrocarbons, pesticides, herbicides, minerals, metals, and other chemicals of concern. The results are presented in Table DR-PH-178-1, showing that four metals considered as TACs are present in the well water (arsenic, hexavalent chromium, manganese, and zinc). Emissions calculations for the project's health risk assessment were revised to include the metals detected in the groundwater samples (AECOM 2010a).

The applicant has modified the project to replace the two originally proposed HTF heaters with heat exchangers that would provide freeze protection for the circulating HTF at night. The HTF heat exchangers would use hot steam from the STGs to warm the HTF, which would require the auxiliary boilers to operate more often than originally proposed (up to 100 hours per year for each boiler). The auxiliary boilers' new operating hours and estimated emissions are provided in Appendix D of the applicant's engineering changes (Galati & Blek 2010i). Staff determined that the increased boiler

operational hours would only slightly increase the annual TAC emissions and would not add significantly to health and safety risks. Therefore the HRA was not revised.

Other changes that have been proposed since the SA/DEIS and which may impact the health and safety analysis includes the following:

- Reconfiguration of the power blocks' layout,
- Addition of a fuel depot on-site during construction and operation

Staff reviewed the reconfigured power block layouts and the reconfigured alternative site layouts and determined that they do not add significantly to health and safety risks and therefore the HRA was not revised.

The applicant proposes to add a concrete batch plant and a diesel/gasoline fuel depot to the construction phase of the project. The operation of the concrete batch plant would result in increased TAC emissions during construction as well as increased diesel exhaust and fugitive dust emissions. Emissions of volatile TACs from the diesel and gasoline fuel depot would also occur. Staff reviewed the estimated levels of pollutants associated with the concrete batch plant (Galati & Blek 2010i) and has determined that the increased emissions are minimal and would not add significantly to public health impacts during construction. The applicant did not revise the health risk assessment to include additional emissions from the concrete batch plant or the fuel depot. However, staff believes when these new sources are combined with the elimination of two originally proposed HTF heaters and their emissions that the overall net result would not be a significant change in emissions and therefore not a significant change in health risks. Emissions of TACs from a concrete batch plant and from a fuel depot usually result in the highest airborne concentrations being close-in. Given the isolated nature of the power plant from residences and commercial operations where the public would congregate for a period of time (as opposed to rapidly moving through the area when traveling on I-10), staff believes that the risks would not be significant to any on-site or off-site receptor.

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a "worst case" analysis. Maximum hourly emissions are required to calculate acute (one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances that may result from the project. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The applicant's screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP) modeling program. Finally, ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects which might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above method of assessing health effects is consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2003) referred to earlier, and results in the following health risk estimates.

Impacts

The applicant's revised screening health risk assessment including all sources as presented in DR-PH-174 resulted in a maximum acute hazard index of 0.11 and a maximum chronic hazard index of 0.00076 at the point of maximum impact (PMI). The worst-case cancer risk was found to be 1.35 at the PMI. As **Public Health Table 3** shows, both acute and chronic hazard indices are under the significance level of 1.0, and cancer risk is below the significance level of 10 in 1,000,000, indicating that no short- or long-term adverse health effects are expected.

Public Health Table 3
Operation Hazard/Risk at Point of Maximum Impact

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.11	1.0	No
Chronic Noncancer	0.00076	1.0	No
Individual Cancer	1.35 in 1 million	10 in 1 million	No

Source: Table DR-PH-174-1 of applicant's data response set 1 (AECOM 2010a)

Staff Analysis

Staff conducted an in-depth evaluation of the risk assessment results presented in the Palen Solar Power Project AFC (09-AFC-7) and in the "Responses to CEC Staff Public Health Data Requests 172-179" (January 2010). Modeling files provided by the applicant were also reviewed.

Construction Phase Staff Analysis

For the construction phase analysis, atmospheric dispersion modeling of diesel particulate matter (DPM) emissions from construction equipment and vehicles was conducted by the applicant using the OFFROAD2007 Model. Total on-site PM emissions from diesel construction equipment exhaust over the estimated 6 year construction period was provided in the January 2010 data responses and is 33,058 lbs. The corresponding annual DPM emission rate for exhaust emissions from onsite construction equipment and vehicles is 472 lb/yr for residential exposure over a 70 year lifetime.

The maximum predicted offsite concentration of diesel particulate matter, on a 70-year basis, was reported by the applicant to be 0.0104 ug/m^3 (Tighe 2010). Cancer risk due to diesel exhaust emissions was determined by multiplying the DPM concentration by the diesel cancer inhalation unit risk of 0.0003 (ug/m^3)$^{-1}$. Cancer risk at the location of the maximum offsite concentration was determined to be 3.1 in a million and chronic HI to be 0.0021 (noncancer chronic REL is 5 ug/m^3).

Operations Phase Staff Analysis

For the operations phase analysis, atmospheric dispersion modeling of facility emissions was conducted by the applicant using AERMOD. Local meteorological data were used,

building downwash effects were included for 14 buildings, and 852 grid receptors were modeled.

A total of 18 emitting units were modeled by the applicant for facility operations including:

- 2 auxiliary boilers
- 4 cooling tower stacks (used for ancillary equipment only)
- 2 HTF (heat transfer fluid) heaters (no longer proposed for this project)
- 2 ullage system vents
- 2 diesel emergency generators
- 2 diesel firewater pumps
- 4 mobile sources involved in routine operations (mirror washing trucks, trucks used in weed abatement, trucks used in application of soil stabilizer, water trucks); 4 on-site points modeled for emissions

The HTF (heat transfer fluid) is circulated through the solar field where it is heated by sunlight concentrated on the receiver tube elements of the solar collectors. HTF is comprised of biphenyl and diphenyl ether. Thermal decomposition of HTF results in decomposition products including benzene, phenol and toluene. In modeling HTF fugitive emissions, the applicant assumed that 99.99% of the emissions would be benzene.

Staff used the HARP On-Ramp program to load the applicant's AERMOD results into the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a for the risk analysis. Exposure pathways assessed include inhalation, ingestion of home-grown produce, dermal absorption, soil ingestion and mother's milk. Emission factors obtained from the applicant's modeling files and used in this analysis are listed in **Public Health Table 5**. For risk calculations using the HARP model, the "Derived (Adjusted) Method" was used for cancer risk and the "Derived (OEHHA) Method" was used for chronic noncancer hazard.

Cancer risk and chronic and acute hazard index values obtained by staff are compared to results reported by the applicant in the January 2010 response to data requests in **Public Health Table 6**. Risk and hazard were determined at the point of maximum impact, PMI, under the 70 year residential scenario, located on the northern fenceline. The nearest residential receptor is located at the northwest corner of the project site (at the edge of a solar array). No sensitive receptors were identified within 3 miles of the project site.

In the applicant's modeling of facility operations, emissions of diesel particulate matter (DPM) from mobile sources were not included, and these sources are listed with zero risk. Staff contacted the applicant's consultant and was provided with an emission file to be used in HARP that included DPM emissions from mobile sources at 250 lb/yr (Wolffe 2010). Staff incorporated this value into its modeling and calculated risks due to all facility sources **(Public Health Table 6)**.

Public Health Table 7 presents substance- and source-specific cancer risks at the PMI. Analysis of the results indicates that 99% of the cancer risk at the PMI is attributed to emissions from two sources: 83% due to emissions from on-site mobile sources of DPM and 16% due to emissions from the HTF from the auxiliary boiler, the HTF heater and ullage system.

Cumulative impacts were not evaluated. Although three solar projects are located within 6 miles of the project site (source: page 5.10-21 of the AFC), staff has repeatedly found at other power plant project sites that cumulative risks would not occur unless the sources were very close in proximity, less than 0.5 miles. No other sources of TACs, either stationary or mobile are within 0.5 miles of the project site.

Public Health Table 5
Operation Phase Emission Rates

Substance	Annual Average Emissions (lbs/year)	Maximum 1-Hour Emissions (lbs/hour)
EMISSION RATES FROM EACH OF 2 AUXILIARY BOILERS		
Benzene	1.10E-01	7.21E-05
Formaldehyde	4.18E+00	2.57E-03
Hexane	1.00E+02	6.00E-02
Naphthalene	3.00E-02	2.09E-05
PAHs-w/o	3.32E-03	2.05E-06
p-DiClBenzene	6.00E-02	4.12E-05
Toluene	1.80E-01	1.17E-04
EMISSION RATES FROM EACH OF 4 COOLING TOWER CELLS used for ancillary equipment only (AECOM 2010a)		
Chloroform	6.94E+01	1.88E-02
Arsenic	4.34E-04	1.17E-07
Cr(VI)	1.02E-02	
Manganese	3.51E-04	
EMISSION RATES FROM EACH OF 2 HTF HEATERS		
Benzene	3.00E-02	7.21E-05
Formaldehyde	1.28E+00	2.57E-03
Hexane	3.09E+01	6.00E-02
Naphthalene	1.00E-02	2.09E-05
PAHs-w/o	1.02E-03	2.05E-06
p-DiClBenzene	2.00E-02	4.12E-05
Toluene	5.00E-02	1.17E-04
EMISSION RATES FROM EACH OF 2 ULLAGE SYSTEM VENTS		
Benzene	3.00E+02	7.40E-01
EMISSION RATES FROM OPERATION OF EACH OF 2 EMERGENCY GENERATORS		
Diesel PM	4.95E+00	9.00E-02
EMISSION RATES FROM OPERATION OF EACH OF 2 EMERGENCY FIRE PUMPS		
Diesel PM	4.95E+00	9.00E-02
EMISSION RATES FROM ON-SITE MAINTENANCE VEHICLES		
Diesel PM	2.50E+02	-

Public Health Table 6

Cancer Risk and Chronic Hazard Due to Operation Phase Emissions

	Staff's Analysis *Includes assessment of risk and hazard due to Diesel Particulate Matter from onsite mobile sources during project operations*			**Applicant's Analysis** *Does not include assessment of risk and hazard due to Diesel Particulate Matter from onsite mobile sources during project operations*		
	Cancer Risk (per million)	**Acute HI**	**Chronic HI**	**Cancer Risk (per million)**	**Acute HI**	**Chronic HI**
PMI (for cancer risk and chronic HI, Rec #372)	7.8	0.11	0.0042	1.35	0.11*	0.00076
MEIR (Rec. #1)	1.9	0.026	0.011	0.11	0.026	0.000056

Cancer PMI (point of maximum impact, Rec. #372) is located on the northern fenceline.
** At Rec #375*

Public Health Table 7

Results of Staff's Analysis: Contribution to Total Cancer Risk by Individual Substances from All Sources at the Point of Maximum Impact (PMI)

Substance	**Auxiliary Boilers (2 units)**	**Cooling Tower (4 stacks)**	**Diesel Generator (2 units)**	**Diesel Firewater Pump (2 units)**
Benzene	2.20E-11			
Chloroform		6.73E-09		
DieselExhPM			3.26E-08	1.62E-08
Formaldehyde	1.75E-10			
Naphthalene	7.17E-12			
PAHs-w/o	3.72E-09			
p-DiClBenzene	4.78E-12			
Arsenic		4.06E-10		
Cr(VI)		2.66E-08		
TOTAL	**3.93E-09**	**3.37E-08**	**3.26E-08**	**1.62E-08**
Substance	**HTF Heater (2 units)**	**Ullage System (2 sources)**	**On-site Mobile Sources (4 sources)**	**Total Cancer Risk**
Benzene	3.66E-12	1.27E-06		1.27E-06
Chloroform				6.73E-09
DieselExhPM			6.46E-06	6.51E-06
Formaldehyde	3.28E-11			2.08E-10
Naphthalene	1.47E-12			8.64E-12
PAHs-w/o	7.01E-10			4.42E-09
p-DiClBenzene	9.77E-13			5.76E-12
Arsenic				4.06E-10
Cr(VI)				2.66E-08
TOTAL	**7.40E-10**	**1.27E-06**	**6.46E-06**	**7.82E-06**

Cooling Towers

In addition to being a source of potential toxic air contaminants, in particular hexavalent chromium due to the project's use of groundwater that contains trace amounts of this substance (AECOM 2010a) DR #178, Table 1), the possibility exists for bacterial growth to occur in the two small wet cooling towers (one at each power block) that are part of the project. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

The State of California regulates recycled water for use in cooling towers in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation does not apply to the PSPP project since it intends to use groundwater supplied from on-site wells; however, the potential remains for Legionella growth in cooling water at the PSPP due to nutrients found in groundwater.

The U.S. EPA published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

In February of 2000 the Cooling Technology Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60% of industrial cooling towers tested were found to contain Legionella. More recently, staff has received a 2005 report of testing in cooling towers in Australia that found the rate of Legionella presence in cooling tower waters to be extremely low, approximately 3-6%. The cooling towers all had implemented aggressive water treatment and biocide application programs similar to that required by proposed condition of certification **Public Health-1**.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

The efficacy of any biocide in ensuring that bacterial and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures and effective monitoring.

In order to ensure that Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, staff has proposed Condition of Certification **Public Health-1**. The condition would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the two cooling towers' water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. Staff believes that with the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance. The applicant has stated that an appropriate biocide program and anti-biofilm agent monitoring program would be implemented for the cooling towers (Solar Millennium 2009a, Section 5.10.3.5).

Closure and Decommissioning Impacts and Mitigation

Closure of the proposed PSPP (temporary or permanent) would follow a closure plan prepared by the applicant and designed to minimize public health and environmental impacts. Staff expects that impacts to public health from the closure and decommissioning process would represent a fraction of the impacts associated with the construction or operation of the proposed PSPP. Therefore based on staff's analysis for the construction and operation phases of this project, staff concludes that public health-related impacts from closure and decommissioning of the PSPP would be insignificant.

C.5.4.3 CEQA LEVEL OF SIGNIFICANCE

Staff's analysis of public health impacts from the proposed PSPP has determined that impacts would be below the level of significance.

C.5.5 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

This alternative is analyzed because

1. It would retain the 500 MW generation capacity defined for the proposed project and the engineering is defined by Solar Millennium as feasible;
2. It reduces impacts to the primary and secondary desert washes that cross the proposed site; and
3. It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

C.5.5.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the Solar Millennium Palen ROW application area but the alternative would remain entirely within BLM managed lands.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. The setting for Unit 2 would be similar to that for the proposed project.

The reconfiguration will slightly change the distances to public receptors which could affect the health risks calculated at the maximum impact receptor. However, staff uses the point of maximum impact to assess worst-case health risks and therefore slight differences in the distances to receptors would not alter the public health analysis.

C.5.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction and operation of the Reconfigured Alternative would have similar public health impacts to those analyzed for the PSPP as proposed, since the alternative is comprised of the same equipment rearranged in a different configuration and location. Staff finds that with respect to public health, the Reconfigured Alternative is not preferable over the project as proposed.

C.5.5.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for public health would not change with the Reconfigured Alternative, as both the project as proposed and the Reconfigured Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Reconfigured Alternative and the project as proposed.

C.5.6 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be approximately 25% smaller, occupying about 2080 acres of land (as compared with 2,740 acres required for the proposed project). The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**. The Reduce Acreage Alternative would result in an approximately 375 MW project.

This alternative is analyzed for several reasons:

1. It would eliminate about 25% of the proposed project area so all impacts would be reduced;
2. It would reduce impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley aeolian sand corridor, and the Mojave Fringe-Toed Lizard by prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields;
3. It would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 2; and
4. It would reduce impacts to primary and secondary desert washes crossing the proposed site.

C.5.6.1 SETTING AND EXISTING CONDITIONS

The Reduced Acreage Alternative would incorporate the following changes from the Reconfiguration Alternative:

1. It would modify the boundaries of Unit 1 as follows:
   - Preclude the use of the northeastern quarter of the westernmost solar field
   - It would reduce and revise the easternmost solar field to avoid the dune habitat
   - It would result in approximately 803 acres or approximately 55% of the Reconfigured Alternative Unit 1 (1,467 acres)
2. It would modify the boundaries of Unit 2 as follows:
   - Eliminate the southernmost segment of Unit 2 (170 acres within Desert Tortoise Critical Habitat)
   - Eliminate the northernmost area of Unit 2 (260 acres of dune sands and MFTL habitat)
   - Add 215 acres to the western end of the second and third rows of solar trough loops to make up for some of the reductions described above.

As such, the setting for the Reduced Acreage Alternative is the same as for the Reconfigured Alternative with the exception of the changes addressed above. As mentioned above for the Reconfigured Alternative, the distances to nearest public receptors would change slightly with this alternative, but the change would not affect the public health analysis.

C.5.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Reduced Acreage alternative is likely to result in reduced emissions due to the smaller scope of the project, which would decrease the cancer risk and chronic and acute hazard indices predicted for the 500 MW project as proposed. However, the public health analysis has determined that the cancer risk and chronic and acute hazard indices are far below the level of significance at the point of maximum impact for the project as proposed. Therefore staff concludes that with respect to public health impacts, the Reduced Acreage Alternative is not preferable over the project as proposed.

C.5.6.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for public health would not change with the Reduced Acreage Alternative, as both the project as proposed and the Reduced Acreage Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Reduced Acreage Alternative and the project as proposed.

C.5.7 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.5.7.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

The reconfiguration will slightly change the distances to public receptors which could affect the health risks calculated at the maximum impact receptor. However, staff uses the point of maximum impact to assess worst-case health risks and therefore slight differences in the distances to receptors would not alter the public health analysis. It would not impact the public traveling on I-10 as any exposure would be of extremely short duration (a matter of seconds).

C.5.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction and operation of Reconfigured Alternative #2 would have similar public health impacts to those analyzed for the PSPP as proposed, since the alternative is comprised of the same equipment rearranged in a different configuration and location. Staff finds that with respect to public health, Reconfigured Alternative #2 is not preferable over the project as proposed.

C.5.7.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for public health would not change with the Reconfigured Alternative #2, as both the project as proposed and the Reconfigured Alternative #2 would have impacts below the level of significance. The same conditions of certification would be required for the Reconfigured Alternative #2 and the project as proposed.

C.5.8 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.5.8.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located on primarily on public land managed by BLM; however, as with the proposed project, it include a 40 acre private parcel on which the applicant has a purchase option. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point and would locate

the power block approximately 2,700 feet (0.5 miles) south of the location for the proposed project. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

The reconfiguration will slightly change the distances to public receptors which could affect the health risks calculated at the maximum impact receptor. However, staff uses the point of maximum impact to assess worst-case health risks and therefore slight differences in the distances to receptors would not alter the public health analysis. It would not impact the public traveling on I-10 as any exposure would be of extremely short duration (a matter of seconds).

C.5.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction and operation of Reconfigured Alternative #3 would have similar public health impacts to those analyzed for the PSPP as proposed, since the alternative is comprised of the same equipment rearranged in a different configuration and location. Staff finds that with respect to public health, Reconfigured Alternative #3 is not preferable over the project as proposed.

C.5.8.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for public health would not change with the Reconfigured Alternative #3, as both the project as proposed and the Reconfigured Alternative #3 would have impacts below the level of significance. The same conditions of certification would be required for the Reconfigured Alternative #3 and the project as proposed.

C.5.9 NO PROJECT/NO ACTION ALTERNATIVE

There are three No Project/No Action Alternatives evaluated in this section, as follows:

No Project/No Action Alternative #1:

No Action on Palen Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the public health-related impacts of the Palen Solar Power Project

would not occur at the proposed site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

No Project/No Action Alternative #2:

No Action on Palen Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. It is expected that public health-related impacts would result from the construction and operation of the solar technology and would likely be similar to the public health-related impacts from the proposed project. As such, this No Project/No Action Alternative could result in the public health-related impacts similar to the impacts under the proposed project.

No Project/No Action Alternative #3:

No Action on Palen Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, this No Project/No Action Alternative would not result in public health-related impacts. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.5.10 PROJECT-RELATED FUTURE ACTIONS

In order to transmit the power generated at the Palen Solar Power Project to the electricity grid, a new substation is required. Southern California Edison Company (SCE) will construct and operate the substation, which will allow the electricity to be carried by the Devers–Palo Verde No. 1 (DPV1) 500 kV transmission line.

The SCE Red Bluff Substation is a reasonably foreseeable project if the PSPP is approved and constructed as proposed. Therefore, this section examines the potential impacts of the construction and operation of the proposed substation. This substation would allow interconnection of the PSPP and other renewable projects in the Desert Center area.

The SCE Red Bluff Substation project will be fully evaluated in a future EIS prepared by the BLM. Because detailed design information is not yet available for the Red Bluff Substation, the impact analysis presented here is based on available information. The purpose of this analysis is to inform the Energy Commission and BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the PSPP.

The project components and construction activities associated with this substation are described in Section B.3 of this RSA, and a map of its location is presented as **Figure B.3-1**. This analysis examines the construction and operational impacts of a 230/500 kV substation that would be located on approximately 90 acres, south of Interstate 10 and southeast of Desert Center. Substation components will include 230 kV and 500 kV lines, 230/ 500 kV transformer banks, associated switchracks, and a microwave tower. The substation would be located in an existing CDCA utility corridor, north of and adjacent to the existing DPV1 500 kV transmission line.

C.5.10.1 ENVIRONMENTAL SETTING

There are many potential public health concerns that could be associated with construction and operation of the SCE Red Bluff Substation. These include health impacts due to the emissions of air pollutants; health risks from the emissions of air contaminants and airborne pathogens; exposure to hazards from the handling of wastes, chemicals and other materials; exposure to electromagnetic fields (EMF) from power transmission; and safety concerns for workers. EMF is discussed in the **Transmission Line Safety and Nuisance** section of this RSA. Small quantities of hazardous or solid waste may be generated during the construction phase of the proposed upgrades, which is discussed under **Hazardous Materials Management** and **Waste Management**. Worker safety is discussed in the **Worker Safety and Fire Protection** section of this RSA.

C.5.10.2 ENVIRONMENTAL IMPACTS

The potential for public exposure to hazardous materials is considered minimal because waste management plans would be implemented (see RSA sections on **Hazardous Materials Management** and **Waste Management**). Releases from the project in wastewater streams are discussed in the section addressing **Soil and Water Resources**. Programs to create a safe workplace for project employees are described in **Worker Safety**.

A public health issue that is not addressed elsewhere in this RSA would be health risks from the emissions of toxic air contaminants during construction. The construction activities caused by the SCE Red Bluff Substation would generate diesel exhaust and fugitive dust emissions at the locations of the Red Bluff Substation site and access road. The localization of construction emissions and the short duration of construction activities expected for this substation greatly reduce the potential for long-term health

impacts to public receptors. In addition, mitigation measures would be implemented to reduce the emissions generated during project construction and operation. It is therefore staff's opinion that with adherence to federal, state, and local regulations protecting public health and with implementation of appropriate mitigation measures to minimize emissions (as discussed below), the construction of the SCE Red Bluff Substation would not cause a significant public health impact.

C.5.10.3 MITIGATION

The SCAQMD is responsible for the project area and developed the SCAQMD State Implementation Plan (SIP) (2007) for inclusion in the 2007 State Implementation Plan (2007 SIP). This plan identifies mitigation measures to reduce air emissions. The substation projects would be required to comply with SCAQMD rules and portable equipment rules, which would dictate how the equipment could be operated. Mitigation measures would be implemented following the SCAQMD Ozone SIP to reduce the emissions generated during project construction and operation.

In addition, with effective and comprehensive control measures such as those listed in the **Air Quality** section of this RSA for the PSPP, dust and equipment exhaust impacts could likely be reduced to a less than significant level and public exposure to air contaminants would not create a significant public health and safety risk.

C.5.10.4 CONCLUSION

The construction and structure removal activities associated with the SCE's Red Bluff Substation would cause emissions due to heavy-duty diesel and gasoline-powered construction equipment and fugitive particulate matter (dust) emissions from activity on unpaved surfaces. With effective and comprehensive control measures such as those recommended in the **Air Quality** section of this RSA/PA/DEIS for the proposed PSPP, dust and equipment exhaust impacts could likely be reduced to a less than significant level. As a result, public exposure to air contaminants would not be expected to generate a significant public health and safety risk.

C.5.11 CUMULATIVE IMPACT ANALYSIS

Section B.3, Cumulative Scenario, provides detailed information on the potential cumulative solar and other development projects in the project area. Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed project. In summary, these projects are:

- Renewable energy projects on BLM, State, and private lands, as shown on **Cumulative Figure 1** and in **Cumulative Tables 1A and 1B.** Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable projects currently proposed in California.
- Foreseeable future projects in the immediate area as shown on **Cumulative Impacts Figure 2, I-10 Corridor Existing and Future/Foreseeable Projects, and Cumulative Tables 2 and 3**. Table 2 presents existing projects in this area and Table 3 presents future foreseeable projects in the I-10 Corridor Area. Both tables indicate project name and project type, its location and its status.

These projects are defined within a geographic area that has been identified by the Energy Commission and BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under CEQA and/or NEPA. Even if the cumulative projects described in Section B.3 have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this RSA/PA/DEIS.

C.5.11.1 GEOGRAPHIC SCOPE OF ANALYSIS

For the purpose of the public health cumulative analysis, emissions from construction or operation of the PSPP could potentially combine with emissions from past, present and reasonably foreseeable projects to result in adverse health effects to the public. Cumulative impacts in the area of public health could occur if emission sources are close enough so that their plumes combine. Due to differences in emission source elevations, terrain features, wind direction, and other meteorological factors, it is unlikely that emission plumes from two or more facilities would combine unless they are located in very close proximity. Furthermore, dispersion of plumes tends to occur in parallel, preventing the mixing of plumes from separate locations. On the basis of numerous previous air dispersion modeling conducted by staff to assess public health cumulative impacts, staff finds that the geographic area considered for cumulative impacts on Public Health is only within the project boundaries or within 0.5 miles of the project.

C.5.11.2 EFFECTS OF PAST AND PRESENT PROJECTS

Staff analyzed the potential of existing projects in the vicinity of the PSPP to contribute to cumulative impacts. The only nearby existing source of emissions is Interstate 10, a major route for trucks delivering goods to and from California, located about 0.5 miles south of the PSPP. This source is located close enough to the proposed PSPP site for public health cumulative impacts to be feasible. However, due to the low emissions of TACs modeled for this project and the resulting minimal health risks, the potential for significant cumulative impacts is extremely low. In addition, the point of maximum impact modeled by the applicant was located near the northern facility fenceline, about 2 miles north of I-10. Furthermore, emissions from I-10 would be predominantly DPM from truck traffic, which has been demonstrated to have very localized impacts, with the highest concentration of DPM occurring in the immediate vicinity of the source (SCAQMD 2000). Previously modeled cumulative impacts for several projects in San Francisco, Hayward, and Carlsbad have all demonstrated that unless two sources are within about a block of each other their impacts do not combine to turn an insignificant individual health risk into a significant one. Based on these past results, staff concludes that the cumulative impacts of the PSPP combined with I-10 emissions would be insignificant.

C.5.11.3 FORESEEABLE FUTURE PROJECTS

Foreseeable Projects in the Project Area

Staff analyzed the potential of foreseeable projects in the vicinity of the PSPP to contribute to cumulative impacts. There is a substantial amount of development planned in the general area of PSPP, including over 10 additional solar power plants.

Construction. Cumulative impacts during construction of the PSPP could potentially occur if the project's construction phase is concurrent or overlapping with the construction of other nearby projects. There are no foreseeable projects planned in the immediate vicinity of the PSPP. The nearest planned project is the Chuckwalla Solar I project whose eastern boundary would be about 2 miles northwest of the PSPP western boundary. Staff finds that at this distance there is no potential for significant cumulative impacts to occur.

Operation. Cumulative impacts resulting from the operations phase of PSPP could potentially occur if future facilities emitting TACs were planned to be located within one half of a mile of the PSPP. None of the future foreseeable projects are close enough to meet this criterion and potentially cause a cumulative impact. As mentioned above, staff's previous experience with modeling public health impacts has shown that unless two sources are practically adjacent their impacts do not combine to turn an insignificant individual health risk into a significant one.

Decommissioning. The decommissioning of the PSPP is not expected to result in adverse impacts related to public health. It is unlikely that the construction or decommissioning of any of the cumulative projects would occur concurrently with the decommissioning of this project, because the decommissioning is not expected to occur for approximately 40 years. As a result, it is not expected that significant impacts related to public health during decommissioning of the PSPP generated by the cumulative projects will occur.

C.5.11.4 OVERALL CONCLUSION

Public health impacts of the PSPP would not combine with impacts of any past, present, or reasonably foreseeable projects to result in cumulatively considerable local or regional impacts. Therefore, no mitigation is recommended to address potential cumulative project impacts.

C.5.12 COMPLIANCE WITH LORS

Staff has considered the minority population as identified in **Socioeconomics Figure 1** in its impact analysis and has found no potential significant adverse impacts for any receptors, including environmental justice populations. In arriving at this conclusion, staff notes that its analysis complies with all directives and guidelines from the Cal/EPA Office of Environmental Health Hazard Assessment and the California Air Resources Board. Staff's assessment is biased toward the protection of public health and takes into account the most sensitive individuals in the population. Using extremely conservative (health-protective) exposure and toxicity assumptions, staff's analysis demonstrates that members of the public potentially exposed to toxic air contaminant emissions of this project—including sensitive receptors such as the elderly, infants, and people with pre-existing medical conditions—will not experience any significant chronic or cancer health risk as a result of that exposure. Staff believes that it incorporated every conservative assumption called for by state and federal agencies responsible for establishing methods for analyzing public health impacts. The results of that analysis indicate that there would be no direct or cumulative significant public health and safety impact to any population in the area. Therefore, given the absence of any significant health impacts,

there are no disparate health impacts and there are no environmental justice issues associated with **Public Health**. Staff concludes that construction and operation of the PSPP will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **Public Health**.

C.5.13 NOTEWORTHY PUBLIC BENEFITS

It is noteworthy that a solar electric generating facility such as the proposed PSPP project would emit significantly less 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 PSPP would provide much needed electrical power to California residences and businesses, and will contribute to electric reliability. Electrical power is not only necessary to maintain a functioning society, but it also benefits many individuals who rely on powered equipment for their health (such as dialysis equipment and temperature control equipment). For example, it is documented that during heat waves in which elevated air-conditioning use causes an electrical blackout, hospitalizations and deaths due to heat stroke are increased.

C.5.14 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

PUBLIC HEALTH-1 The Project owner shall develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is kept to a minimum. The Plan shall be consistent with either staff's "Cooling Water Management Program Guidelines" or with the Cooling Technology Institute's "Best Practices for Control of Legionella" guidelines but in either case, the Plan must include sampling and testing for the presence of Legionella bacteria at least every 6 months. After 2 years of power plant operations, the Project owner may ask the CPM to re-evaluate and revise the Legionella bacteria testing requirement.

Verification: At least 60 days prior to the commencement of cooling tower operations, the Cooling Water Management Plan shall be provided to the CPM for review and approval.

C.5.15 CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the PSPP and does not expect any significant adverse cancer, short-term, or long-term health effects to any members of the public including low income and minority populations, from project toxic emissions. Staff also concludes that its analysis of potential health impacts from the proposed PSPP uses a conservative health protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the PSPP project would not contribute significantly to

morbidity or mortality in any age or ethnic group residing in the project area. With the incorporation of staff's proposed mitigation (Condition of Certification **PUBLIC HEALTH-1**), the proposed facility will not present a significant health risk to the public.

C.5.16 REFERENCES

AECOM 2010a – AECOM Environment (tn: 55035). Data Responses, Set 1 (#1-280), dated 1/22/2010.

American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) 1998 – Legionellosis: Position Paper. June 25.

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CAISO 2008 – Memorandum To CAISO Board of Governors from Gary DeShazo, Director of Regional Transmission North and Laura Manz, Vice President of Market & Infrastructure Development *Re Decision on elimination of the dual fuel requirement for San Diego area starting in 2009,* October 20, 2008

CAPCOA 1993 – California Air Pollution Control Officers Association. CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines. Prepared by the Toxics Committee. October.

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CTI (Cooling Technology Institute) 2000 – Guidelines: Best Practices for Control of Legionella.

EPA (Environmental Protection Agency) November 1999 – (EPA-822-R-99-001) "Legionella: Human Health Criteria Document."

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United States Department of Health and Human Services (DHHS) 2000 – "Healthy People 2010. Understanding and Improving Health." 2nd ed. Washington, DC: US Government Printing Office. http://www.health.gov/healthypeople/.

Wolffe 2010 – Electronic communication from Gregory Wolffe of AECOM Environment to Effie Fourakis of Risk Science Associates. February 10.

C.6 LAND USE, RECREATION, AND WILDERNESS

The Land Use Section will be included in the Revised Staff Assessment, Part 2.

C.7 – NOISE AND VIBRATION

Testimony of Shahab Khoshmashrab

C.7.1 SUMMARY OF CONCLUSIONS

The Palen Solar Power Project (PSPP), if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration laws, ordinances, regulations and standards, and would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively. The applicant has proposed appropriate mitigation, in the form of good design practice and selection of appropriate project equipment that would avoid any significant adverse impacts.

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

C.7.2 INTRODUCTION

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

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the proposed project, and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations and standards (LORS). For an explanation of technical terms used in this section, please refer to **Noise Appendix A**, immediately following.

C.7.3 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and either eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA's guidelines (Cal. Code Regs., tit. 14, App. G) describes some characteristics that could signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
2. exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels;
3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying Item 3, above, to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by more than 5 dBA at the nearest sensitive receptor.

Staff has concluded that an increase in background noise levels up to and including 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA, however, is clearly significant. An increase of between 5 and 10 dBA should be considered adverse, but could be either significant or insignificant, depending upon the particular circumstances of a particular case.

Factors to be considered in determining the significance of an adverse impact as defined 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 to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary; and
- the use of heavy equipment and noisy[1] activities is limited to daytime hours.

Staff uses the above method and threshold to protect the most sensitive populations.

[1] Noise that draws legitimate complaint.

C.7.3.1 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Noise Table 1
Laws, Ordinances, Regulations and Standards

Applicable Law	Description
Federal	
Occupational Safety & Health Act (OSHA): 29 U.S.C. § 651 et seq. U.S. Environmental Protection Agency (USEPA)	Protects workers from the effects of occupational noise exposure Assists state and local government entities in development of state and local LORS for noise
State	
California Occupational Safety & Health Act (Cal-OSHA): 29 U.S.C. § 651 et seq., Cal. Code Regs., tit. 8, §§ 5095-5099	Protects workers from the effects of occupational noise exposure
Local	
Riverside County General Plan, Noise Element Riverside County Noise Ordinance, Ordinance 847 (Regulating Noise)	Establishes goals, objectives, and procedures to protect the public from noise intrusion. Specifies sound level limits. Limits hours of construction

C.7.3.2 FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration, (OSHA) adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A, Table A4**, immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

Guidelines are available from the U.S. Environmental Protection Agency (USEPA) to assist state and local government entities in developing state and local LORS for noise. Because there are existing local LORS that apply to this project, the USEPA guidelines are not applicable.

There are no federal laws governing off-site (community) noise.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of perception is 65 vibrational decibel (VdB), which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

C.7.3.3 STATE

California Government Code Section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its general plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

The State of California, Office of Noise Control, prepared the Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. This model also defines a simple tone, or "pure tone," as one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by 5 A-weighted decibels (dBA).

The California Occupational Safety and Health Administration (Cal-OSHA) has promulgated occupational noise exposure regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to federal OSHA standards (see **Noise Appendix A, Table A4**).

C.7.3.4 LOCAL

The project is located within Riverside County. The Noise Element of the Riverside County General Plan (Riverside County 2007) and the Riverside County Noise Ordinance (Riverside County 2008) apply to this project.

Riverside County Noise Element

The County Noise/Land Use Compatibility Guidelines, provided in the Noise Element, are used to evaluate potential noise impacts and provide criteria for environmental impact findings and conditions for project approval. Land use compatibility defines the acceptability of a land use in a specified noise environment. For residential land uses, these guidelines categorize noise levels of up to 60 dBA day/night average sound level (Ldn) or CNEL as "normally acceptable" and up to 70 dBA Ldn or CNEL as "conditionally acceptable".

Riverside County Noise Ordinance

The Noise Ordinance allows for different levels of acceptable noise depending upon land use. Section 4 of Ordinance No. 847 (Regulating Noise) limits noise on any property that causes the exterior noise level on any other occupied property to 55 dBA during the daytime hours and 45 dBA during the nighttime hours, for noise-sensitive receptors[2] within a very low density rural area, such as the area surrounding the project site.

This Noise Ordinance also limits the hours of construction activities to the hours of 6:00 a.m. to 7:00 p.m., June through September, 6:00 a.m. to 6:00 p.m., October through May, Mondays through Fridays, and to 9:00 a.m. to 5:00 p.m. on Saturdays.

[2] A sensitive noise receptor, also referred to as a noise-sensitive receptor, is a receptor at which there is a reasonable degree of sensitivity to noise (such as residences, schools, hospitals, elder care facilities, libraries, cemeteries, and places of worship).

C.7.4 PROPOSED PROJECT

C.7.4.1 SETTING AND EXISTING CONDITIONS

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

The land use of the PSPP site is undeveloped open space, and the surrounding land uses include undeveloped land and some agricultural land to the west of the project site.

There is one residence located approximately 25 feet from the northwest corner of the project right-of-way boundary, but over 1 mile from the nearest power block. The power block would be the major source of the power plant's noise during the facility's operation. Another residence is located approximately 3,500 feet northwest of the site boundary and well over a mile from the nearest power block (Solar Millennium 2009a, AFC § 5.8.2.3).

Ambient Noise Monitoring

In order to establish a baseline for the comparison of predicted project noise with existing ambient noise, the applicant has presented the results of an ambient noise survey (Solar Millennium 2009a, AFC § 5.8.2.4; Tables 5.8-5, 5.8-6). Ambient noise levels were measured near the western boundary of the PSPP site, near the two residences to the northwest of the project site, on May 18 to May 19, 2009. One long-term measurement was taken near the two residences over a 25-hour period between 6:51 p.m., May 18, and 7:51 p.m., May 19, 2009. The survey was performed using acceptable equipment and techniques. The noise survey monitored existing noise levels near the nearest sensitive receptors, shown in **Noise Figure 1**:

1. Location LT1: closest residence to the project site. This is a residence located approximately 25 feet from the northwest corner of the project right-of-way boundary, but over 1 mile from the nearest power block. A location near this residence (LT, as shown in **Noise Figure 1**) was monitored continuously between 6:51 p.m., May 18, and 7:51 p.m., May 19, 2009.
2. Location LT2: the second closest residence to the project site. This is a residence located approximately 3,500 feet northwest of the site boundary and well over a mile from the nearest power block. A location near this residence (LT, as shown in **Noise Figure 1**) was monitored continuously between 6:51 p.m., May 18, and 7:51 p.m., May 19, 2009.

Because of the similarity of the noise environments between these residences and the long-term survey location, staff finds it reasonable to use the results of this survey as the baseline for the existing ambient noise levels at these noise-sensitive receptors.

Noise Table 2 summarizes the ambient noise measurements (Solar Millennium 2009a, AFC § 5.8.2.4; Table 5.8-6).

Noise Table 2
Summary of Measured Noise Levels

Measurement Sites	Measured Noise Levels, dBA	
	Average During Daytime Hours L_{eq}	Average During Nighttime Hours L_{eq}
LT1, Nearest Residence	43[1]	34[2]
LT2, Second Nearest Residence	43[1]	34[2]

Source: Solar Millennium 2009a, AFC § 5.8.2.4; Table 5.8-6
1 - Staff calculations of average of the daytime hours
2 - Staff calculations of average of the nighttime hours

C.7.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities and normal long-term operation of the project.

Construction Impacts and Mitigation

Construction noise is usually a temporary phenomenon. Construction of the PSPP project is expected to be typical of similar projects in terms of equipment used and other types of activities (Solar Millennium 2009a, AFC § 5.8.3.2).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

The applicant has predicted a construction noise level of 59 dBA at the nearest residential receptor, LT1. It is shown here in **Noise Table 3**.

Noise Table 3
Predicted Construction Noise Level

Receptor	Highest Construction Noise Level L_{eq} (dBA)[1]	Measured Existing Ambient, Average Daytime L_{eq} (dBA)[2]	Cumulative, Using Highest Noise Level of 48 dBA	Change
LT1	59	43	59	+16
LT2	46	43	48	+5

Sources:
1 - Solar Millennium 2009a, AFC § 5.8.3.1, and staff's calculations
2 - **Noise Table 2**, above

The applicable local noise LORS do not limit the loudness of construction noise, but staff compares the projected noise levels with ambient levels (please see the following discussion under **CEQA Impacts**).

The applicant commits to performing noisy construction work during the times specified in the Riverside County Noise Ordinance, to the hours of 6:00 a.m. to 7:00 p.m., June through September, and 6:00 a.m. to 6:00 p.m., October through May, Mondays through Fridays, and 9:00 a.m. to 5:00 p.m. on Saturdays, with no construction allowed on Sundays and Federal holidays (Solar Millennium 2009a, AFC § 5.8.3.1). To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

Therefore, the noise impacts of the PSPP project construction activities would comply with the noise LORS.

CEQA Impacts

Since construction noise typically varies with time, it is most appropriately measured by, and compared with, the L_{eq} (energy average) metric. Even though project construction would likely last 39 months, the construction activities within an area that would potentially considerably impact the nearest residential receptor would not last more than several months. The nearest location to the nearest residence (LT1) where there would be more than minimal activities is the northwestern extent of the solar arrays of Unit #2, approximately 1,000 feet from the residence. At this distance, construction noise from site grading and array installation would not exceed 59 dBA L_{eq} at the residence, temporarily resulting in a 16 dBA increase in the ambient noise level at LT1 (see **Noise Table 3** above); this is a considerable increase. However, this impact would be only for the short time that construction activities occur in that portion of the site. Noise levels would decrease the farther away construction activities occur from the residence.

The second nearest residence (LT2) is also located northwest of the project site, but it is further away from the site than LT1 is. The above activities in the northwestern extent of the solar arrays of Unit #2 would likely generate a noise level of 46 dBA L_{eq} at the LT2. This will result in a temporary increase in the ambient noise level at LT2 of 5 dBA (see **Noise Table 3** above). Staff considers an increase of 5 dBA to be less than significant.

Therefore, because of the temporary nature of these activities and because construction would be limited to the daytime hours, the noise effects of plant construction are considered to be less than significant at the above receptors.

To ensure the project construction would create less than significant adverse impacts at the most noise-sensitive receptors, in addition to Condition of Certification **NOISE-6**, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process to resolve any complaints regarding construction noise.

In light of the following proposed conditions of certification, the noise impacts of the PSPP project construction activities would be less than significant.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feed water and steam systems, the piping and tubing that comprise the steam path have accumulated dirt, rust, scale, and construction debris such as weld spatter, dropped welding rods, and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. Traditionally, high pressure steam is then raised in the boiler or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a *high pressure steam blow*, is quite effective at cleaning out the steam system. A series of short steam blows, lasting 2 or 3 minutes each, are performed several times daily over a period of 2 or 3 weeks. At the end of this procedure, the steam lines are connected to the steam turbine, which is then ready for operation. Alternatively, high pressure compressed air can be substituted for steam.

High pressure steam blows, if unsilenced, can typically produce noise levels as high as 129 dBA at a distance of 50 feet; this would amount to roughly 88 dBA at LT1 and 84 at LT2. Unsilenced steam blows could be disturbing at the nearest noise-sensitive receptors, depending on the frequency, duration, and noise intensity of venting. With a silencer installed on the steam blow piping, noise levels are commonly attenuated to 89 dBA at 50 feet.

A quieter steam blow process, referred to as *low pressure steam blow* and marketed under names such as QuietBlow™ or Silentsteam™, has become popular. This method utilizes lower pressure steam over a continuous period of about 36 hours. Resulting noise levels reach about 86 dBA at 50 feet.

Linear Facilities

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than 2 or 3 days. Further, construction activities would be limited to daytime hours. To ensure that these hours are, in fact, adhered to, in compliance with the LORS, staff proposes Condition of Certification **NOISE-6**.

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving. The applicant anticipates that pile driving would not be required for construction of the PSPP project (Solar Millennium 2009a, AFC § 5.8.3.2). Therefore no vibration impacts are expected.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized applicable LORS that would protect construction workers

(Solar Millennium 2009a, AFC §§ 5.8.1, 5.8.4). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

The primary noise source of the PSPP plants would be the power blocks, where the steam turbine generators, air-cooled condensers, electric transformers, and various pumps and fans would be located. The project's two power blocks (one for each 250 MW unit) would be centrally located in the middle of each 1,380-acre solar unit; these blocks would be surrounded by the solar reflector fields. In addition, there would be diesel-powered emergency generators, which would be enclosed by a noise-reducing structure that would reduce noise levels to approximately 70 dBA at 50 feet. The overall noise generated by these various noise sources would be based on the configuration of the sources, the number and power rating of the equipment, and any noise-reducing measures incorporated. Staff compares the projected project noise with applicable LORS, in this case the Riverside County noise LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

The project would avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design (Condition of Certification **NOISE-4**).

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (Solar Millennium 2009a, AFC § 5.8.3.3). The applicant has predicted the operational noise level at the nearest sensitive receptor; it is shown in **Noise Table 4** below.

The Noise Ordinance allows for different levels of acceptable noise depending upon land use. Section 4 of Ordinance No. 847 (Regulating Noise) limits noise on any property that causes the exterior noise level on any other occupied property to 55 dBA during the daytime hours and 45 dBA during the nighttime hours, for noise-sensitive receptors within a very low density rural area, such as the area surrounding the project site. The applicant predicts the project's operational noise level at receptor LT1, the nearest receptor, to be 42 dBA L_{eq} (Solar Millennium 2009a, AFC § 5.8.3.3). This level is less than the above LORS requirements.

The above predicted operational noise level also complies with the Riverside County's guideline that considers a noise level of up to 60 dBA day/night average (Ldn) or CNEL (Community Noise Equivalent Level) to be normally acceptable.

To ensure compliance, staff proposes Condition of Certification **NOISE-4**. Also to ensure compliance, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process requiring the applicant to resolve any problems caused by operational noise.

With implementation of the following conditions of certification, noise due to the operation of the PSPP project would be in compliance with the applicable LORS.

CEQA Impacts

As explained, the PSPP project would operate during the daylight hours. Thus, staff compares the project's noise levels to the existing daytime ambient noise levels at the project's noise-sensitive receptor. (Please see below for limited nighttime activities.)

Typically, daytime ambient noise consists of both intermittent and constant noises. The noise that stands out during this time is therefore best represented by the average noise level, referred to as L_{eq}. Staff's evaluation of the above noise surveys shows that the daytime noise environment in the project area consists of both intermittent and constant noises. Thus, staff compares the project's noise levels to the daytime ambient L_{eq} levels at the project's noise-sensitive receptors.

The applicant has predicted the operational noise level at LT1; it is shown here in **Noise Table 4**.

Noise Table 4
Predicted Operational Noise Levels at the Identified Sensitive Residential Receptors

Receptor	Project Alone Operational Noise Level (dBA)[1]	Measured Existing Ambient, Daytime L_{eq} (dBA)[2]	Cumulative L_{eq} (dBA)	Increase in Existing Ambient (dBA)
LT1	42	43	46	+3
LT2	33[3]	43	43	0

Sources:
1 - Solar Millennium 2009a, AFC § 5.8.3.2
2 - **Noise Table 2**, above
3 - Staff's calculations based on the noise modeling in the AFC.

Combining the ambient noise level of 43 dBA L_{eq} (**Noise Table 4**, above) with the project noise level of 42 dBA at LT1 would result in 46 dBA L_{eq}, 3 dBA above the ambient. As described above (in **Method and Threshold for Determining Significance**), staff regards an increase of up to 5 dBA as a less-than-significant impact. Therefore, staff considers the above noise impact at LT1 to be less than significant.

Combining the ambient noise level of 43 dBA L_{eq} (**Noise Table 4**, above) with the project noise level of 33 dBA at LT2 would result in 43 dBA L_{eq}; the project would not cause an increase in the ambient noise level. Therefore, there would be no impact at this location.

Adverse impacts on residential receptors can also be identified by comparing predicted power plant noise levels with the nighttime ambient background noise levels at the nearest sensitive residential receptors. The project would have limited nighttime activities related to maintenance. The applicant's projection of the noise level from these activities at LT1 is 22 dBA (Solar Millennium 2009a, AFC § 5.8.3.3). This is significantly lower than the average nighttime ambient noise level of 34 at LT1 (**Noise Table 2**, above), and thus, the project's nighttime activities would have less than significant impact on the project's most noise-sensitive receptor. Subsequently, these activities would likely have no impact on LT2, due to its further distance from the project site than LT1.

Staff proposes Condition of Certification **NOISE-4** to ensure that the noise level due to project operation would not exceed the above level (in **Noise Table 4**, second column).

Tonal Noises

One possible source of annoyance could be strong tonal noises. Tonal noises are individual sounds (such as pure tones) which, while not louder than permissible levels, stand out in sound quality. To ensure that tonal noises do not cause public annoyance, staff proposes Condition of Certification **NOISE-4**, which would require mitigation measures, if necessary, to ensure the project would not create tonal noises.

Linear Facilities

All water pipes and gas pipes would be underground and therefore silent during plant operation. Noise effects from electrical interconnection lines typically do not extend beyond the lines' right-of-way easements and would be inaudible to receptors.

Vibration

Vibration from an operating power plant could be transmitted through two primary means: ground (ground-borne vibration), and air (airborne vibration).

The operating components of the PSPP plant would consist of high-speed steam turbine generators and various pumps and fans. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors would be attached to the turbines and generators. Based on experience with numerous previous projects employing similar equipment, staff agrees with the applicant that ground-borne vibration from the PSPP project would be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. However, none of the project equipment is likely to produce noticeable low frequency noise beyond the project site boundaries. This makes it highly unlikely that the PSPP would cause perceptible airborne vibration effects at any offsite noise-sensitive receptor.

Worker Effects

The applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards and commits to compliance with all applicable LORS (Solar Millennium 2009a, AFC § 5.8.4). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required and provided. To ensure that plant operation and maintenance workers are adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**. For further discussion of proposed worker safety conditions of certification, please see **Worker Safety and Fire Protection** section of this document.

C.7.4.3 CEQA LEVEL OF SIGNIFICANCE

For the purposes of CEQA compliance, the significance of construction and operating noise impacts of the proposed project at the nearest sensitive receptors has been determined.

Construction Impacts

As discussed in detail in section C.7.4.2 above (under the subsection entitled "Construction Impacts and Mitigation"), the noise level increase at the nearest sensitive receptor resulting from construction of the project (presented in **Noise Table 3**) would be considerable. However, given the temporary nature of construction noise and the fact that noisy construction activity would be restricted to daytime hours (by both the local LORS and Condition of Certification **NOISE-6**), the impacts due to construction noise are considered less than significant.

Operation Impacts

As discussed in detail in section C.7.4.2 above (under the subsection entitled "Operation Impacts and Mitigation"), power plant noise level is predicted to be 42 dBA L_{eq} at the most noise-sensitive receptor during daytime operation, which would result in a barely noticeable increase over the ambient noise. No change in the ambient noise at this receptor at night would result from plant operation. Thus, operation noise impacts of the project would be insignificant.

C.7.4.4 FACILITY CLOSURE

All operational noise from the project would cease when the PSPP project closes, and no further adverse noise impact from its operation would be possible. The remaining potential temporary noise source would be the dismantling of the project structures and equipment, as well as any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it could be similarly treated – that is, noisy work would be performed during daytime hours with machinery and equipment that are properly equipped with mufflers. Any noise LORS in existence at that time would apply. Unless modified, applicable conditions of certification included in the Energy Commission decision would also apply.

C.7.5 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be approximately 25% smaller, occupying about 2080 acres of land (as compared with 2,740 acres required for the proposed project). The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**. The Reduce Acreage Alternative would result in an approximately 375 MW project.

This alternative is analyzed for several reasons:

1. It would eliminate about 25% of the proposed project area so all impacts would be reduced;
2. It would reduce impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley aeolian sand corridor, and the Mojave Fringe-Toed Lizard by prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields;
3. It would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 2; and

4. It would reduce impacts to primary and secondary desert washes crossing the proposed site.

C.7.5.1 SETTING AND EXISTING CONDITIONS

The Reduced Acreage Alternative would incorporate the following changes from the Reconfiguration Alternative:

1. It would modify the boundaries of Unit 1 as follows:
   - Preclude the use of the northeastern quarter of the westernmost solar field
   - It would reduce and revise the easternmost solar field to avoid the dune habitat
   - It would result in approximately 803 acres or approximately 55% of the Reconfigured Alternative Unit 1 (1,467 acres)
2. It would modify the boundaries of Unit 2 as follows:
   - Eliminate the southernmost segment of Unit 2 (170 acres within Desert Tortoise Critical Habitat)
   - Eliminate the northernmost area of Unit 2 (260 acres of dune sands and MFTL habitat)
   - Add 215 acres to the western end of the second and third rows of solar trough loops to make up for some of the reductions described above.

As such, the setting for the Reduced Acreage Alternative is the same as for the Reconfigured Alternative with the exception of the changes addressed above.

C.7.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Because the major sources of project noise, the power blocks, would be located approximately in the same general area, the noise impacts of this alternative would likely be similar to the proposed project; that is, less than significant.

C.7.5.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA Level of Significance of the Reduced Acreage Alternative would be unchanged from the proposed project.

C.7.6 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is defined by Solar Millennium as feasible;

- It reduces impacts to the primary and secondary desert washes that cross the proposed site; and
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

C.7.6.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the Solar Millennium Palen ROW application area but the alternative would remain entirely within BLM managed lands.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. The setting for Unit 2 would be similar to that for the proposed project.

This alternative would have the same generating capacity (500 MW) and the same project footprint (2,970 acres) as the proposed project.

C.7.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Because the major sources of project noise, the power blocks, would be located approximately in the same general area, the noise impacts of this alternative would likely be similar to the proposed project; that is, less than significant.

C.7.6.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA Level of Significance of the Reconfigured Alternative would be unchanged from the proposed project.

C.7.7 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.7.7.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The Reconfigured Alternative #2 Unit 1 power block would be located approximately 2,700 feet (0.5 miles) south of the location for the proposed project. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

This alternative would have the same generating capacity (500 MW) and approximately the same project footprint as the proposed project.

C.7.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Because the major sources of project noise, the power blocks, would be located approximately in the same general area, the noise impacts of this alternative would likely be similar to the proposed project; that is, less than significant.

C.7.7.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA Level of Significance of Reconfigured Alternative #2 would be unchanged from the proposed project.

C.7.8 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.7.8.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located on primarily on public land managed by BLM; however, as with the proposed project, it include a 40 acre private parcel on which the applicant has a purchase option. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The Reconfigured Alternative #3 Unit 1 power block would be located approximately 2,700 feet (0.5 miles) south of the location for the proposed project. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

This alternative would have the same generating capacity (500 MW) and approximately the same project footprint as the proposed project.

C.7.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Because the major sources of project noise, the power blocks, would be located approximately in the same general area, the noise impacts of this alternative would likely be similar to the proposed project; that is, less than significant.

C.7.8.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA Level of Significance of Reconfigured Alternative #3 would be unchanged from the proposed project.

C.7.9 NO PROJECT/NO ACTION ALTERNATIVES

The No Project Alternative under CEQA or the No Action Alternative under NEPA defines the scenario that would exist if the proposed Palen Project were not constructed. The CEQA Guidelines state that “the purpose of describing and analyzing a ‘no project’ alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project” (Cal. Code Regs., tit. 14 § 15126.6(i)). The No Project analysis in this RSA considers existing conditions and “what would be reasonably expected to occur in the foreseeable future if the project were not approved…” (Cal. Code Regs, tit. 14 § 15126.6(e)(2)).

If the No Project/No Action Alternative were selected, the construction and operational impacts of the Palen project would not occur. There would be no grading of the site, no loss of resources or disturbance of approximately 5,000 acres of desert habitat, no impacts to cultural resources, and no installation of power generation and transmission equipment. The No Project/No Action Alternative would also eliminate contributions to cumulative impacts on a number of resources and environmental parameters in Riverside County and in the Colorado Desert as a whole.

In the absence of the Palen Project, however, other power plants, both renewable and non-renewable, would have to be constructed to serve the demand for electricity and to meet RPS. If the No Project/No Action Alternative were chosen, other utility-scale solar power facilities may be built, and the impacts to the environment may be similar to those of the proposed project because these technologies require large amounts of land like that required for the Palen Project. The No Project/No Action Alternative may also lead to siting of other non-solar renewable technologies to help achieve the California RPS.

C.7.10 CUMULATIVE IMPACTS

Section B.3, Cumulative Scenario, provides detailed information on the potential cumulative solar and other development projects in the project area. Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed project. In summary, these projects are:

- Renewable energy projects on BLM, State, and private lands, as shown on **Cumulative Figure 1** and in **Cumulative Tables 1A and 1B.** Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable projects currently proposed in California.
- Foreseeable future projects in the project area, as shown on **Cumulative Impacts Figure 2, I-10 Corridor Existing and Future/Foreseeable Projects, and Cumulative Tables 2 and 3**. Table 2 presents existing projects in this area and Table 3 presents future foreseeable projects in the I-10 Corridor Area. Both tables indicate project name and project type, its location and its status.

These projects are defined within a geographic area that has been identified by the Energy Commission and BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under CEQA. Even if the cumulative projects described in Section B.3 have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this RSA.

Geographic Scope of Analysis

The geographic area considered for cumulative impacts on Noise and Vibration is the Palen Solar Power Project's site and the area immediately surrounding this site (within approximately 1 mile of the site boundaries).

Effects of Past and Present Projects

There are no projects listed in Section B.3 that would be close enough to the Palen Solar Power Project site to create significant cumulative noise impacts at the project's noise-sensitive receptors, when combined with the Palen Solar Power Project.

Effects of Reasonably Foreseeable Future Projects

There are no projects listed in Section B.3 that would be close enough to the Palen Solar Power Project site to create significant cumulative noise impacts at the project's noise-sensitive receptors, when combined with the Palen Solar Power Project.

Contribution of the Palen Solar Power Project to Cumulative Impacts

Construction. The construction of the Palen Solar Power Project is expected to result in short term adverse impacts related to construction activities. It is expected that some of the cumulative projects described above which are not yet built may be under construction the same time as the Palen Solar Power Project. As a result, there may be short term noise impacts during construction of those cumulative projects, but due to the relatively long distances between the Palen Solar Power Project site and those projects, Palen Solar Power Project would not be expected to contribute considerably to the possible short term cumulative impacts related to Noise and Vibration.

Operation. The operation of the Palen Solar Power Project is expected to result in a less than significant long term adverse noise impact during operation of the project. It is expected that some of the cumulative projects described above may be operational at the same time as the Palen Solar Power Project. However, there are no projects listed in Section B.3 that would be close enough to the Palen Solar Power Project site to create significant cumulative noise impacts at the project's noise-sensitive receptors, when combined with the Palen Solar Power Project.

Decommissioning. The decommissioning of the Palen Solar Power Project is expected to result in adverse impacts related to Noise and Vibration similar to construction impacts. It is unlikely that the construction or decommissioning of any of the cumulative projects would occur concurrently with the decommissioning of this project, because the decommissioning is not expected to occur for approximately 40 years. As a result, there may not be impacts related to Noise and Vibration during decommissioning of the Palen Solar Power Project generated by the cumulative projects. As a result, the impacts of the decommissioning of the Palen Solar Power Project would not be expected to contribute to cumulative impacts related to Noise and Vibration.

C.7.11 COMPLIANCE WITH LORS

A detailed discussion of the proposed project's compliance with LORS applicable to noise and vibration is provided above in subsection C.7.4.2.

C.7.12 NOTEWORTHY PUBLIC BENEFITS

The proposed project would affect the daytime ambient noise levels in the project area. While this change would be barely noticeable at the project's most noise-sensitive receptor, and thus not significant, development of the proposed project would not result in any noteworthy public benefits.

C.7.13 PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC NOTIFICATION PROCESS

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within 1 mile of the project site and the linear facilities, by mail or by 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. If the telephone is not staffed 24 hours a 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 where it is visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the compliance project manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed, and describing the method of that notification. This communication shall also verify that the telephone number has been established and posted at the site, and shall provide that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the project, 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 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 in the complaint;
- if the noise is project related, take all feasible measures to reduce the source of the noise; and
- submit a report documenting the complaint and actions taken. The report shall include: a complaint summary, including the final results of noise reduction efforts and, if obtainable, a signed statement by the complainant stating that the noise problem has been resolved to the complainant's satisfaction.

Verification: Within 5 days of receiving a noise complaint, the project owner shall file a Noise Complaint Resolution Form, shown below, with both the local jurisdiction and the CPM, that documents the resolution of the complaint. If mitigation is required to resolve the 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 performed and complete.

EMPLOYEE NOISE CONTROL PROGRAM

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high (above permissible) noise levels during construction in accordance to the applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit the noise control program to the CPM. 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 the operation of the project will not cause the noise levels due to plant operation alone, during the daytime hours of 7 a.m. to 10 p.m. to exceed an average of 42 dBA L_{eq} measured at or near monitoring location LT1.

No new pure-tone components shall be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

A. When the project first achieves a sustained output of 85% or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at monitoring location LT1, or at a closer location acceptable to the CPM. This survey shall also include measurement of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been caused by the project.

   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 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 residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.

B. If the results from the noise survey indicate that the power plant noise at the affected receptor site exceeds the above value during the above time period, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

C. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: The survey shall take place within 30 days of the project first achieving a sustained output of 85% or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limit, and a schedule,

subject to 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 the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

OCCUPATIONAL NOISE SURVEY

NOISE-5 Following the project's attainment of a sustained output of 85% or greater of its rated capacity, the project owner shall conduct an occupational noise survey to identify any noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) 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 a report of the survey results and, if necessary, identify proposed mitigation measures to be employed in order to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

CONSTRUCTION RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times delineated below, unless a special permit has been issued by the County of Riverside:

Mondays through Fridays:	
June through September:	6 a.m. to 7 p.m.
October through May:	6 a.m. to 6 p.m.
Saturdays:	9 a.m. to 5 p.m.
Sundays and Federal holidays:	No Construction Allowed

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. 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 the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

NOISE-7 If a traditional, high-pressure steam blow process is used the project owner shall equip steam blow piping with a temporary silencer that quiets the noise

of steam blows to no greater than 89 dBA measured at a distance of 100 feet. The steam blows shall be conducted between 8:00 a.m. and 5:00 p.m. unless arranged with the CPM such that offsite impacts would not cause annoyance to receptors. If a low-pressure, continuous steam blow process is used, the project owner shall submit to the CPM a description of the process, with expected noise levels and planned hours of steam blow operation.

Verification: At least 15 days prior to the first steam blow, the project owner shall notify all residents or business owners within 1 mile of the project site boundary. The notification may be in the form of letters, phone calls, fliers, or other effective means as approved by the CPM. The notification shall include a description of the purpose and nature of the steam blow(s), the planned schedule, expected sound levels, and explanation that it is a one-time activity and not part of normal plant operation.

C.7.14 CONCLUSIONS

Staff concludes that the PSPP project, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration LORS and would produce no significant direct or cumulative adverse noise impacts on people within the project area, directly, indirectly, or cumulatively.

C.7.15 REFERENCES

Riverside County 2007 – Riverside County General Plan, Noise Element.

Riverside County 2008 – Riverside County Municipal Code, Noise Ordinance, Title 9, Chapter 9.52 Noise Regulation.

Solar Millennium 2009a – Solar Millennium (tn: 52937). Application for Certification Vol 1 & 2, dated 8/24/2009.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Palen Solar Power Project
(09-AFC-7)

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).

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about 7 decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971).

In order to help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** has been provided to illustrate common noises and their associated sound levels, in dBA.

Noise Table A1

Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the noise level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

Noise Table A2
Typical Environmental and Industry Sound Levels

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.
2. Outside of the laboratory, a 3 dB change is considered a barely noticeable difference.
3. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.
4. A 10 dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a 3 dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). The rules for decibel addition used in community noise prediction are:

Noise Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988.

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by 6 dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

Noise Table A4

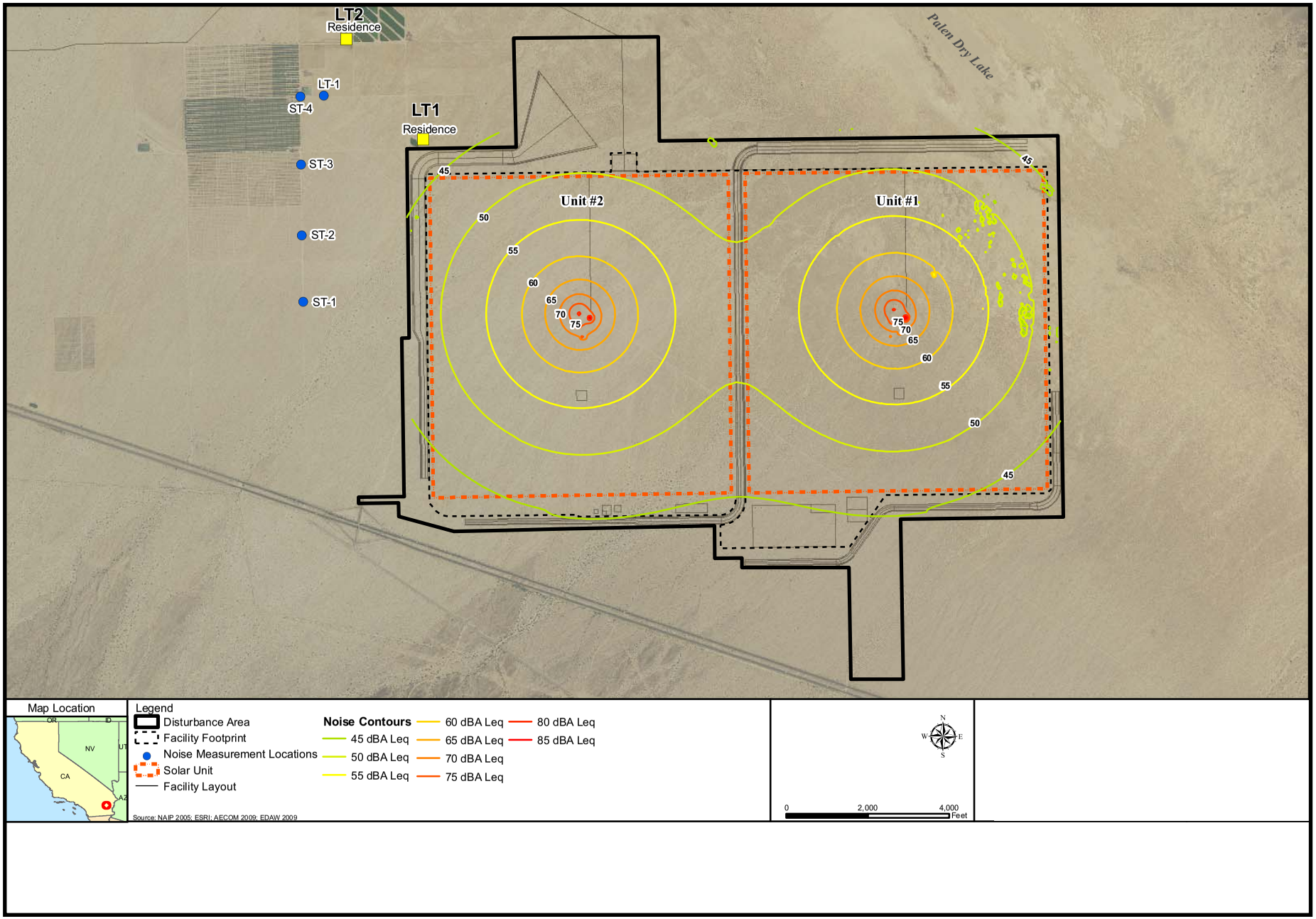
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 CFR § 1910.95.

NOISE AND VIBRATION - FIGURE 1

Palen Solar Power Project - Noise Measurement Locations and Noise Contours



NOISE AND VIBRATION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.8-1

C.8 - SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Testimony of Scott Debauche

C.8.1 SUMMARY OF CONCLUSIONS

Energy Commission staff ("staff") has reviewed the Palen Solar Power Project (PSPP or proposed project) in accordance with the requirements of the California Environmental Quality Act (CEQA). Staff concludes that the PSPP would not cause a significant adverse direct or indirect impact or contribute to a cumulative socioeconomic impact on the area's housing, schools, parks and recreation, police, or hospitals.

The construction and operation of the proposed project would not result in any disproportionate socioeconomic impacts to low-income or minority populations. Gross public benefits from the project include capital costs, construction and operation payroll, and sales tax from construction and operation spending.

Staff has concluded in the **Worker Safety and Fire Protection** section of this report that the project would cause a significant direct and cumulative impact on local fire protection services. As discussed in the **Worker Safety and Fire Protection** section of this report, staff proposes a new fire station required by **Worker Safety-7** to mitigate for the direct and cumulative impacts of the project on local fire protection services. It should be noted that this potentially significant impact to fire protection services was determined using the significance thresholds presented in the **Worker Safety and Fire Protection** section, which are independent and differ from those utilized within this **Socioeconomics** section to determine potential impacts to police, school, emergency services, and recreational public services. Please refer to the **Worker Safety and Fire Protection** section of this report for a detailed discussion of fire protection services. Please refer to the **Land Use, Recreation, and Wilderness** section of this document for further analysis of recreation impacts.

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

C.8.2 INTRODUCTION

The socioeconomics impact analysis evaluates project-related changes on existing population and housing patterns, and community services. In addition, this section provides demographic information related to environmental justice. A discussion of the estimated beneficial economic impacts of the construction and operation of the PSPP and other related socioeconomic impacts are provided.

C.8.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

With respect to CEQA, 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.

A project may have a significant effect on socioeconomics if the project 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; or
- adversely impact acceptable levels of service for public services, including: police protection, schools, parks and recreation, and emergency medical services.

In addition to the above, the PSPP socioeconomics analysis identifies beneficial fiscal and economic effects, including impacts on local finances from property and sales taxes as well as the creation of employment, employment revenue, and the purchases of goods and services during both PSPP construction and operation.

To satisfy the requirements of Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," this section identifies any disproportionate minority and low-income populations within the PSPP study area. Any disproportionate significant impacts to minority and low-income populations are discussed within each environmental issue area section of this document.

Criteria for subject areas such as utilities, fire protection, water supply, and wastewater disposal are analyzed in the **Reliability, Worker Safety and Fire Protection,** and **Soils and Water Resources** sections of this document. Impacts on population, housing, parks and recreation, schools, medical services, law enforcement, and cumulative impacts are based on subjective judgments and data from local and state agencies. Typically, long-term employment of people from regions outside the study area could potentially result in significant adverse socioeconomic impacts.

C.8.4 PROPOSED PROJECT

C.8.4.1 SETTING AND EXISTING CONDITIONS

Laws, Ordinances, Regulations, and Standards

Socioeconomics and Environmental Justice Table 1 contains socioeconomics and environmental justice laws, ordinances, regulations, and standards (LORS) applicable to the proposed PSPP.

Socioeconomics and Environmental Justice Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
State	
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, Sections 65996-65997	Except for a fee, charge, dedication, or other requirement authorized under Section 17620 of the Education Code, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

REGIONAL STUDY AREA

The proposed project includes the construction and operation of a solar generating facility located in the Southern California inland desert, approximately 10 miles east of the small community of Desert Center, in eastern Riverside County, CA. AFC Figure 5.11-1 (Estimated Travel Time for Project Workers) visually depicts contours from the PSPP site up to a two-hour commute shed (Solar Millennium 2009a, Figure 5.11-1). Based on staff's independent review of these contours, which focus on the I-10 freeway corridor, staff disagrees with the AFC conclusion that the proposed project regional study area includes San Diego County, CA; Imperial County; CA; Yuma County, AZ; or Maricopa County, AZ (Solar Millennium 2009a, pp 5.11-4 and 5.11-5). As shown in AFC Figure 5.11-1, while the two-hour commute shed contour contains small portions of these counties, there are no populated urban centers located within the two-hour commute area. Therefore, for purposes of this analysis, staff defines the socioeconomics regional study area as including Riverside County, CA; San Bernardino County, CA; and La Paz County, AZ.

In order to characterize the population and housing profile of the regional study area, current and forecasted population trends as well as current housing trends for the study area are summarized in **Socioeconomics and Environmental Justice Table 2**. As shown in **Table 2**, the regional study contains a high number of housing units, with San Bernardino and Riverside Counties contributing the largest numbers within the PSPP study area. Among all communities within the study area, La Paz County has the highest vacancy rate.

Socioeconomics and Environmental Justice Table 2
Population and Housing Profile of the Regional Study Area

Population				
Area	**2008**	**2010 Projected**	**2020 Projected**	**2030 Projected**
Riverside County, CA	2,078,601	2,239,053	2,904,848	3,507,498
San Bernardino County, CA	2,055,766	2,177,596	2,582,777	2,957,744
La Paz County, AZ	21,544	22,632	25,487	28,074
Housing				

Population		
Area	**2008 Total Housing Units**	**2008 Vacancy Rate**
Riverside County, CA	773,402	13.2
San Bernardino County, CA	612,801	11.6
La Paz County, AZ[1]	15,577	42.7

Notes:
1 - Data from 2007.
Source: Solar Millennium 2009a, Tables 5.11-4 and 5.11-5.

LOCAL STUDY AREA

As required by the Bureau of Land Management (BLM) Land Use Planning Handbook, Appendix D requirements (BLM 2009), a project analysis of this type needs to consider existing socioeconomic conditions and impacts on several geographic scales. An analysis at a local level presents a challenge because the proposed project is in a sparsely populated area, with the largest urban center being the City of Riverside located approximately 100 miles west of the site. Based on BLM requirements, a reasonable study area for localized socioeconomic impacts would include the two nearest communities: the City of Blythe, CA (approximately 25 miles east of the PSPP site); and the City of Ehrenburg, AZ (approximately 30 miles east of the PSPP site). The most recently published population and housing data for these communities is presented below in **Socioeconomics and Environmental Justice Table 3.**

Socioeconomics and Environmental Justice Table 3
Population and Housing Profile of the Local Study Area

Area	2008 Population	2008 Total Housing Units	2008 Vacancy Rate
Blythe, CA	21,627	5,444	16.1
Ehrenburg, AZ	1,409	824 [1]	34.9 [1]

Notes:
1 - Data from 2000.
Source: Solar Millennium 2009a, Tables 5.11-4 and 5.11-5

Based on Staff research, the economic structure of these local study area communities that may be affected by the management of BLM lands includes primarily a tourism, mining, and infrastructure related economic base, with both communities being rural suburban locations closely tied to the Interstate 10 travel route between the cities of Los Angeles, CA and Phoenix, AZ.

ENVIRONMENTAL JUSTICE/DEMOGRAPHIC SCREENING

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 US Environmental Protection Agency (EPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are

required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

Civil Rights Act of 1964, Public Law 88-352, 78 Stat. 241 (Codified as amended in scattered sections of 42 U.S.C.) Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, or national programs in all programs or activities receiving federal financial assistance.

California law defines environmental justice as “the fair treatment of people of all races, cultures and income with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies” (Government Code Section 65040.12 and Public Resources Code Section 72000).

All Departments, Boards, Commissions, Conservancies and Special Programs of the Resources Agency must consider environmental justice in their decision-making process if their actions have an impact on the environment, environmental laws, or policies. Such actions that require environmental justice consideration may include:

- Adopting regulations;
- Enforcing environmental laws or regulations;
- Making discretionary decisions of taking actions that affect the environment;
- Providing funding for activities affecting the environment; and
- Interacting with the public on environmental issues.

In considering environmental justice in energy siting cases, staff uses a demographic screening analysis to determine whether a low-income and/or minority population exists within the potentially affected area of the proposed site. The potentially affected area consists of a 6-mile radius of the site and is consistent with air quality modeling of the range of a project’s air quality impacts. The demographic screening is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, December, 1997) and *Guidance for Incorporating Environmental Justice Concerns in EPA’s Compliance Analyses* (U.S. Environmental Protection Agency, April, 1998). The screening process relies on Year 2000 U.S. Census data to determine the presence of minority and below-poverty-level populations.

Staff has followed each of the above steps for the following 11 sections in the FSA: Over the course of the analysis in the areas of Air Quality, Hazardous Materials, Land Use, Noise, Public Health, Socioeconomics, Soils and Water, Traffic and Transportation, Transmission Line Safety/Nuisance, Visual Resources, and Waste Management, staff considered whether there would be a significant impact on an environmental justice population.

Minority Populations

According to *Environmental Justice: Guidance Under the National Environmental Policy Act*, minority individuals are defined as members of the following groups: American

Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population, for the purposes of environmental justice, is identified when the minority population of the potentially affected area is greater than 50% or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis.

For the PSPP, the total population within a 6-mile radius of the proposed site is 17 persons, and the total minority population is 10 persons or 58.8% of the total population (see **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Figure 1**). As the demographic screening area as a whole exceeds 50.0%, as shown in **Figure 1, those technical areas that have the potential to result in an environmental justice impact (as identified in the Executive Summary)**have considered environmental justice in their environmental impact analyses.

Below-Poverty-Level Populations

Staff has also identified the current below-poverty-level population based on Year 2000 U.S. Census block group data within a 6-mile radius of the project site.[1] The total population within a 6-mile radius of the proposed site evaluated for low-income populations is 1,440 persons, and the total low-income population is 407 persons or 28.3% of the total population.

C.8.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Induce Substantial Population Growth

For the purpose of this analysis, staff defines “induce substantial population growth” as workers permanently moving into the project area because of project construction and operation, thereby encouraging construction of new homes or extension of roads or other infrastructure. To determine whether the project would induce population growth, staff analyzes the availability of the local workforce and the population within the region. Staff defines “local workforce” for the PSPP project to be the Riverside/San Bernardino/Ontario Metropolitan Statistical Area (MSA), which includes both Riverside and San Bernardino Counties.[2] While the City of Ehrenberg within La Paz County, AZ is located within the proposed project local and regional study areas, respectively, and could contribute to the local workforce, detailed labor skill data is unavailable for this limited portion of the regional and local study area. As shown above in **Socioeconomics and Environmental Justice Table 2**, due to the size of the La Paz County population, presenting local workforce data for the entire State of Arizona would not be representative of the available workforce within the county. However, it should be noted that construction workforce from within this county and local communities would contribute to the local workforce as identified in detail below.

[1] To accurately map the affected population typically includes only US census blocks that contain over 50% of the blocks’ geographic area within a 6-mile radius of a proposed site. In the PSPP case, the census blocks surrounding the site are extremely large and capture population that extended well beyond the 6-mile radius. However, when using the same census blocks used to determine minority population, the low-income population would have accounted for zero persons. Therefore, the census data used to determine low-income population includes all census blocks intersected by the 6-mile radius, regardless if over 50% of the blocks’ geographic area was contained within.

[2] Metropolitan Statistical Areas are geographic entities defined by the U.S. Office of Management and Budget (OMB) for use by Federal and State statistical agencies in collecting, tabulating, and publishing socioeconomic statistics.

Construction

The applicant expects that construction of the proposed PSPP would last for 39 months, resulting in an average of approximately 566 daily construction workers peaking with a daily workforce of 1,145 workers during month 17 of construction (Solar Millennium 2009a, p. 5.11-25). This peak employment number is used to analyze worst-case construction population and employment impacts. **Socioeconomics and Environmental Justice Table 4** shows Year 2006-2016 occupational employment projections for the Riverside/San Bernardino/Ontario MSA by construction labor skill as compared to the estimated number of total construction workers by craft needed during the peak month (month 17) as presented in the AFC (Solar Millennium 2009a, p. 5.11-26).

Socioeconomics and Environmental Justice Table 4
Total Labor by Skill in Riverside/San Bernardino/Ontario MSA (2006 and 2016 Estimate) and PSPP Required Construction by Craft, Peak Month

Trade	Total Workers for Project Construction by Craft (peak month)	Riverside/ San Bernardino/ Ontario MSA 2006	Riverside/ San Bernardino/ Ontario MSA 2016
Surveyor	12	1,420	1,670
Operator	90	4,790	5,460
Laborer[1]	185	27,930	32,080
Truck Driver[1]	35	27,930	32,080
Oiler[1]	4	27,930	32,080
Carpenter	100	28,850	32,390
Boilermaker[2]	11	4,630	5,330
Paving Crew	0	630	720
Pipe Fitter	326	4,630	5,330
Electrician	150	6,740	7,600
Cement Finisher	100	4,110	4,690
Ironworker	59	19,460	20,800
Millwright[3]	25	2,630	2,960
Tradesman[1]	10	27,930	32,080
Project Manager[4]	3	10,990	12,380
Construction Manager	3	4,380	5,110
PM Assistant[4]	4	10,990	12,380
Support[5]	4	120	130
Support Assistant[5]	4	120	130
Engineer	10	1,370	1,600
Timekeeper[4]	3	10,990	12,380
Administrator[4]	6	10,990	12,380
Welder	1	3,960	4,640

Notes:
1 - The “Construction Laborers” category was used.
2 - The “Plumbers, Pipefitters, and Steamfitters” category was used.
3 - The “Machinists” category was used.
4 - The “Supervisors, Construction and Extraction Workers” category was used.
5 - The “Helpers - Construction Trades” category was used.
Source: Solar Millennium 2009a, Tables 5.11-8 and 5.11-17.

As shown in **Socioeconomics and Environmental Justice Table 4**, there is more than adequate local availability of construction workforce within the Riverside/San Bernardino/Ontario MSA alone for the PSPP.

When considering potential socioeconomic impacts of workers required for PSPP construction, staff considered information provided in the AFC and current California Department of Finance data for the Riverside/San Bernardino/Ontario MSA as presented in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 4**. Staff also utilized the findings of an Electric Power Research Institute report titled Socioeconomic Impacts of Power Plants, construction workers will commute as much as two hours to construction sites from their homes, rather than relocate (Solar Millennium 2009a, p 5.11-25). During preparation of this analysis, staff consultation with the Building and Trades Council of San Bernardino and Riverside Counties also indicated that construction workers within San Bernardino and Riverside counties regularly commute 2-hours each direction daily for work (CEC 2010b). Based on these data sources, staff concludes the majority of construction workers will come from within this regional study area.

As stated in the AFC, it is anticipated that the vast majority of the construction workforce (a peak workforce of 1,145 workers and an average of 566 workers per day over the 39-month duration of PSPP construction) would commute to the project site from within the regional study area rather than relocate (Solar Millennium2009a, p 5.11-25). Staff concurs with this AFC conclusion. However, to fully evaluate the potential for impacts, staff assumes that up to 15% of construction workers could seek local lodging in the PSPP local area during the workweek. It should be noted that this would be a temporary and fluctuating demand on local lodging. Staff assumes that because data indicates the workforce would likely come from within the regional study area, it is speculative to quantify if and in what numbers construction workers may permanently relocate from the regional study area to the PSPP local area for a limited duration construction job with the PSPP. Based on this assumption, it is possible that during the peak construction month (worst-case scenario) up to 172 workers could seek local lodging.

<u>Hotel/Motel</u>. Data compiled by Smith Travel Research for hotels, motels, and bed and breakfast inns (B&Bs) with 15 or more rooms identified 19 hotels with a total of 878 rooms within the local study area in 2008, which presents the most current available data (GSEP2009a, p. 5.8-5). These hotels were all located in Blythe, which is the only community with hotels or motels with 15 or more rooms within one hour's driving distance. The average annual occupancy rate for hotels in Riverside and San Bernardino Counties in 2007 was 70.8% (GSEP2009a, p. 5.8-6). Applying this ratio (70.8%) to the total number of hotel rooms identified within one hour of the PSPP site suggests that, on average, a total of 256 unoccupied rooms were available for rent in Blythe in 2008.

Fifty-seven hotels with a total of 8,285 rooms were identified in communities located from 1 to 1.5 hours drive from the PSPP site (GSEP2009a, p. 5.8-6). These communities include Indio, Palm Desert, Indian Wells, and Rancho Mirage. Applying the 2008 average occupancy ratio (70.8%) suggests that, on average, 2,419 unoccupied rooms are available for rent within 1 to 1.5 hours drive of the PSPP site. A total of 129 hotels with 7,541 rooms were identified in communities within 1.5 to 2 hours' drive from

the PSPP site (GSEP2009a, p. 5.8-6). These communities include Desert Hot Springs, Palm Springs, and Needles. Assuming an annual average occupancy rate of 70.8%, 2,202 unoccupied motel and hotel rooms were available for rent within 1.5 to 2 hours drive from the PSPP site. It should be noted that data was unavailable for local study area hotel/motel rooms located within Arizona, but is certainly available to workers.

Housing Vacancy. As shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3**, based on current vacancy rates for the city of Blythe approximately 876 vacant housing units were available in 2008. Furthermore, as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3**, recent data indicates that approximately 1,594 local housing units were available within the cities of Ehrenburg and Quartzsite, AZ**.**

Campground/RV Parks. There are at least 10 Recreational Vehicle (RV) parks located in the vicinity of Blythe, with a combined total of about 800 spaces (GSEP2009a, p. 5.8-5). RV parks in Blythe tend to be located along the Colorado River and receive higher levels of use during the summer. Contact with a small sample of these RV parks suggests that while they have a large number of spaces, many of these are occupied by year-round residents or privately owned, and would not be available for use by construction workers (GSEP2009a, p. 5.8-6). Additional RV parks are located in Ehrenberg, Arizona, and Quartzsite, Arizona, approximately 4 miles and 20 miles east of Blythe, respectively. The town of Quartzsite web site states there are more than 70 RV parks in the vicinity of the community that are typically occupied between October and March, with visitors attracted to the gem, mineral, and swap meet shows which are popular tourist attractions in the area (GSEP2009a, p. 5.8-6).

BLM operates two primitive campgrounds in the general vicinity of the PSPP local study area: Wiley's Well Campground and Coon Hollow Campground, both located south of I-10 on Wiley's Well Road (GSEP2009a, p. 5.8-6). Except for "special areas" with specific camping regulations, vehicle camping is allowed anywhere on BLM-administered land within 300 feet of any posted Open Route. There are, however, no facilities in these locations and there is a 14-day limit for camping in any one location. After 14 days, campers wishing to stay in the area longer are required to move 25 miles from their original camp site (GSEP2009a, p. 5.8-6). Long-term camping is available by permit in Long-Term Visitor Areas (LTVAs) on BLM lands. There are two LTVAs located in the vicinity of Blythe and the Project site: Mule Mountain, which includes the Wiley's Well and Coon Hollow campgrounds, and Midland, located north of the city of Blythe. LTVAs are for recreation use only and workers would not be permitted to use these areas (GSEP2009a, p. 5.8-6).

Conclusion. Based on this available local study area data, staff concludes that any construction workers seeking RV and campground lodging would likely find limited availability in the local study area during the winter months. However, as discussed above, staff anticipates ample local housing would be available to any construction worker seeking local housing. Based on the availability of short-term housing in the local study area when compared to a maximum temporary peak demand of up to 172 workers potentially seeking local housing during the workweek, staff concludes that construction of the proposed project would not temporarily induce substantial growth or concentration of population in the local study area and construction of the PSPP would

not encourage people to permanently relocate to the area due to temporary construction employment associated with the PSPP.

Operation

The proposed PSPP is expected to require a total of 134 permanent full-time employees (Solar Millennium 2009a, p. 5.11-29). **Socioeconomics and Environmental Justice Table 5** shows Year 2006-2016 occupational employment projections for the Riverside/San Bernardino/Ontario MSA (by operational labor skill as compared to the estimated number of total operational workers needed as presented in the AFC (Solar Millennium 2009a,p. 5.11-29).

Socioeconomics and Environmental Justice Table 5
Total Labor by Skill in Riverside/San Bernardino/Ontario MSA (2006 and 2016 Estimate) and PSPP Required Operation

Trade	Total Workers for Project Operation	Riverside/ San Bernardino/ Ontario MSA 2006	Riverside/ San Bernardino/ Ontario MSA 2016
Plant and System Operators	--	2,030	2,380
Power Plant Operators	--	310	370
Total	*134*	*2,340*	*2,750*

Source: Solar Millennium 2009a, Table 5.11-8.

As shown in **Table 5**, data for the Riverside/San Bernardino/Ontario MSA indicates that in the Year 2006, the “Plant and System Operators” and “Power Plant Operators” employment sector contained a total of 2,350 workers, with Year 2016 forecasts for these employment sectors to grow to a total of 2,750 employees. On p. 5.11-29 of the AFC, the applicant states that 75% of workers would come from within the regional study area workforce, resulting in a potential influx of approximately 34 workers in communities within the proposed PSPP regional and local study areas (Solar Millennium 2009a). However, staff’s independent analysis (based on **Table 5**) shows that there is more than an adequate local workforce for project operation regardless of the specialized nature of the proposed project.

As stated on p. 5.11-29 of the AFC, the applicant states that 75% of workers would come from within the regional study area workforce, resulting in a potential influx of approximately 34 workers in communities within the proposed PSPP regional and local study areas (Solar Millennium2009a). In the event these 34 permanent operational employees choose to live closer to the PSPP site, as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3** the most current published local study area vacancy rates for the cities of Blythe, CA; Ehrenberg, AZ; and Quartzsite, AZ are 16.1, 34.9, and 41.9%, respectively. These vacancy rates indicate ample local housing is available should these operational employees choose to relocate to the local study area. Additionally, research shows that power plant workers may commute as much as two hours each direction from their communities rather than relocate (Solar Millennium2009a, p 5.11-25). Therefore, staff believes some of these 34 workers that may relocate to the area may choose to live outside of the local study area or will choose to commute from their current residence within the regional study area. As shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 2**, the regional study

area provides a high number of available housing opportunities. The addition of up to 34 workers to either the local or regional study area would not permanently induce substantial growth or concentration of population in excess of available housing or forecasted growth.

As shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**, staff agrees with the AFC data indicating that the PSPP will result in the generation of both indirect and induced employment. However, staff cannot speculate as to the type, potential hiring practice/requirements, and potential for employee relocation as a result of these indirect and induced jobs at the time of this publication. While it is possible that a portion of this indirect and induced employment would occur within the local study area (increase in food workers, etc.), a number of jobs could not (solar power plant equipment manufacturing, etc.). A number of induced and indirect employment jobs could potentially occur outside of the local study area or California. Therefore, staff concludes it is speculative to quantify what if any numbers of indirect and induced employees may seek permanent housing in the PSPP local study area. However, based on the number of projected indirect and induced employment (as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**), it is assumed that the vacancy rate of the local and regional study area (as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE TABLES 2** and **3**) could adequately provide housing for any potential portion of indirect and induced employment population that may permanently relocate to the PSPP local study area and this population would be within projections for the regional study area (as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE TABLE 2**).

Based on these conclusions, staff concludes that under CEQA, inducement of substantial population growth through permanent employment associated either directly or indirectly by the PSPP would be a less than significant impact.

Displace Existing Housing and Substantial Numbers of People

The proposed PSPP site is vegetated with desert scrub throughout and includes some sand dunes in the northeast, with no housing structures existing on the property (Solar Millennium 2009a, p. 5.7-12). Two residences exist west of the PSPP site, but would not be impacted by the project (Solar Millennium 2009a, p. 5.7-14). As such, no housing or persons would be displaced by the PSPP.

As discussed above, staff concludes that the required construction workforce of the PSPP would be found in the regional study area and an assumed 15% of workforce temporary inmigration that could occur would not trigger the need for new housing in the local study area based on available hotel/motel rooms and vacant housing units within the local study area. Furthermore, as discussed above, vacancy rates within the local study area offer operational employees (estimated at up to 34 workers), as well as potential indirect and induced employment workers, wishing to relocate within the local study area ample available housing. Therefore, staff concludes that no significant construction or operation-related impacts are expected for the regional and local study area housing supply, availability, or demand, and the PSPP would not displace any populations or existing housing, and it would not necessitate construction of replacement housing elsewhere.

Result in Substantial Physical Impacts to Government Facilities

Physical impacts to public services and facilities are usually associated with population in-migration and growth in an area, which increase the demand for a particular service, leading to the need for expanded or new facilities. Public service providers serving the PSPP site are located within Riverside County only and represent the local study area. Therefore, the study area for the public services analysis is limited to Riverside County.

As discussed under the subject headings below, the PSPP would not cause significant impacts to service ratios, response times, or other performance objectives relating to law enforcement, schools, parks and recreation, or emergency medical service facilities.

Please refer to the **Worker Safety and Fire Protection** section of this report for a detailed discussion of fire protection services. Please refer to the **Land Use, Recreation, and Wilderness** section of this document for further analysis of recreation impacts.

Police Protection

The PSPP site would be served by the Riverside County Sheriff's Department Colorado River Station at 260 North Spring Street in Blythe provides service to the unincorporated area from Red Cloud Road on the west, to the Arizona state line on the east, and from county line to county line on the north and south (Solar Millennium 2009a, p. 5.11-20). Communities included in this service area are Desert Center, Eagle Mountain, East Blythe, Hayfield, Midland, Nicholls Warm Springs, Ripley, and the Colorado River. The Riverside County Sheriff's Department average response time to the PSPP site would depend on the severity of the incident and the location of the deputies on call; however, response time is estimated at 45 to 60 minutes (Solar Millennium 2009a, p. 5.11-20).

Construction. During PSPP construction, the proposed PSPP site would include security fencing (Solar Millennium 2009a, p. 2-20). In addition, during construction on-site security would include trained, uniformed, unarmed personnel whose primary responsibility would be to control ingress and egress of personnel and vehicles, perform fire and security watch during off hours, and perform security badge administration (Solar Millennium 2009a, p. 5.11-28), all of which would minimize the potential need for the Riverside County Sheriff's Department assistance. As discussed above, staff considered it is possible that during the peak construction month (worst-case scenario) up to 172 workers could seek local lodging. This number of potential local study area temporary population increase is considered less than significant as these workers are assumed to already live within the regional study area and are currently a part of the Riverside County Sheriff's Department population served. While the PSPP would increase the number of individuals within the local study area during construction, there would be no permanent population in-migration occurring from PSPP construction that would increase the local population or would require the need for new or expanded law enforcement facilities or staff levels within the PSPP regional or local study areas.

Operation. Once operational, the proposed PSPP site would include security fencing, controlled access gates, and security lighting (Solar Millennium 2009a, pp. 2-20 and 2-22), which would minimize the potential need for the Riverside County Sheriff's Department assistance. As discussed above, the operational workforce for the PSPP is

expected to be hired from within the available regional workforce. It is possible that up to 34 operational employees could choose to relocate to the PSPP local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, it is assumed that some percentage of this population would purchase homes and contribute to the local community through the payment of property taxes. Furthermore, as indicated in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**, the PSPP would pay substantial annual property tax, which contributes to local public safety funding. Additionally, as it is likely a number of these employees already reside within Riverside County, only relocating closer to the PSPP site, they would not result in an increase over the total population policed by the Riverside County Sheriff's Department. Based on these conclusions, staff concludes that operation of the proposed PSPP would not increase the local population or require the need for new or expanded law enforcement facilities or staff levels within the PSPP regional or local study areas.

Schools

The proposed PSPP site area is served by the Palo Verde Unified School District serving the City of Blythe and other remote areas of Riverside County and the Desert Center Unified School District in Desert Center (Solar Millennium 2009a, pp. 5.11-22 and 5.11-23). **Socioeconomics and Environmental Justice Table 6** identifies the schools and year 2006-2007 student enrollments in each of the respective school districts. As shown in **Table 6**, Palo Verde Unified School District (PVUSD), approximately 40 miles east of the PSPP site, offers a full range of educational opportunities with three elementary schools, one middle school, one high school, and a continuation high school.

Socioeconomics and Environmental Justice Table 6
Summary of Schools and Enrollment in Palo Verde and Desert Center School Districts, Year 2006–2007

Palo Verde Unified School District			
School Name	**Community**	**Grades**	**Students**
Felis J. Appleby Elementary School	Blythe	K-5	527
Margaret White Elementary School	Blythe	K-5	666
Ruth Brown Elementary School	Blythe	K-5	652
Blythe Middle School	Blythe	6-8	841
Palo Verde High School	Blythe	9-12	952
Twin Palms Continuation School	Blythe	9-12	97
Desert Center Unified School District			
School Name	**Community**	**Grades**	**Students**
Eagle Mountain Elementary School	Desert Center	K-8	16

Source: Solar Millennium 2009a, Tables 5.11-14 and 5.11-15.

Construction. As discussed above, staff assumes the construction workforce for the PSPP will be hired from within the available regional workforce, with up to 15% of workers potentially seeking temporary local area housing during the workweek to avoid commuting. This temporary local housing need would not result in permanent population in-migration occurring from PSPP construction into the PVUSD. Staff does

not expect that any construction workers seeking local temporary housing would bring school aged children seeking enrollment within the PVUSD, as staff assumes workers would only seek local lodging during the workweek from their permanent homes within the regional study area. Therefore, staff concludes that construction of the PSPP would not require the need for new or expanded PVUSD school facilities or staff levels.

Operation. Like all school districts in the state, the PVUSD is entitled to collect school impact fees for new construction within their district under the California Education Code Section 17620. These fees are based on the project's square feet of industrial space. While the PSPP AFC indicates that an $87,000 school impact fee will be paid to the PVUSD (Solar Millennium2009a, p. 5.11-31), this estimated school impact fee was based on administrative and warehouse space related to each power block located off BLM land (CEC 2010a). At the time of AFC preparation, the applicant did not have complete information regarding facility location at the time of writing (CEC 2010a). Therefore, to be conservative, the AFC assumed that the project would pay the full fee (CEC 2010a). However, since publication of the AFC the applicant has indicated that all industrial space that would trigger application of the fee would be constructed entirely on BLM land (CEC 2010a). Therefore, no private land or lands within the PVUSD's district would be affected and therefore, the provisions of Education Code Section 17620 would not apply to this project, resulting in no school impact fee paid (CEC 2010a). Therefore, the PSPP would be in compliance with Education Code section 17620 (as described in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 1)**.

As discussed above, the operational workforce for the PSPP is expected to be hired from within the available regional workforce. It is possible that up to 34 operational employees could choose to relocate to the PSPP local area from more distant regional study area locations. According to the PVUSD, the school district expects to have the necessary capacity to accommodate new students as a result of operation of the PSPP (Solar Millennium2009a, p. 5.11-23). Based on the volume of students within the PVUSD shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 6**, staff concludes that any contribution of school aged children from 34 potentially permanent relocations to the local study area would account for a small increase in overall PVUSD student body. Staff also acknowledges that it is possible some population inmigration could occur from induced and indirect employment, but cannot speculate as to a quantity at the time of this publication. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, it is assumed that some percentage of this population would purchase homes and contribute to the local community through the payment of property taxes. Furthermore, as indicated in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**, the PSPP would pay substantial annual property tax. The payment of these property taxes would contribute to local education facility funding. Based on this, staff concludes that operation of the proposed PSPP would not require the need for new or expanded school facilities or staff levels within the PSPP regional or local study areas.

Parks and Recreation

The site is currently undeveloped, is not designated for active recreational use, and does not appear to be frequented as a recreational area (Solar Millennium 2009a, p. 5.7-13).

The nearest park facilities to the PSPP site are located within the City of Blythe, located approximately 40 miles east of the PSPP site. The City of Blythe Parks Department is responsible for the maintenance and upkeep of the areas seven parks and one pocket park (City of Blythe, 2009).

Construction. As discussed above, staff assumes the construction workforce for the PSPP will be hired from within the available regional workforce, with up to 15% of workers potentially seeking temporary local area housing during the workweek to avoid commuting. This temporary local housing need would not result in permanent population in-migration occurring from PSPP construction onto either the local or regional study areas. As discussed above, staff concludes that camping and RV facility use would not be available for PSPP construction workers during the winter months seeking local area housing. Therefore, staff concludes that PSPP construction employment would not require the need for new or expanded recreational facilities or staff levels within the PSPP regional or local study areas.

Operation. As discussed above, the operational workforce for the PSPP is expected to come from within the available regional workforce. It is possible that up to 34 operational employees could choose to relocate to the PSPP local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, it is assumed that some percentage of this population would purchase homes and contribute to the local community through the payment of property taxes. Furthermore, as indicated in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**, the PSPP would pay substantial annual property tax, which contributes to local recreational facility funding. Therefore, staff concludes that permanent employment associated with the PSPP would not require the need for new or expanded parks and recreational facilities or staff levels within the PSPP regional or local study areas.

Staff received a scoping letter dated December 22, 2009 from Off Road Business Association, Inc. (ORBA) requesting that the Staff Assessment/Draft Environmental Impact Statement consider impacts of the proposed PSPP on recreational uses in the area including, but not limited to, off-highway vehicles (OHV) use, camping, photography, hiking, wildlife viewing, and rockhounding (ORBA 2009a). Furthermore, ORBA requested that the analysis of potential impacts to the local economy extend to businesses that sell OHV and OHV related equipment. As stated above, the site is currently undeveloped, is not designated for active recreational use, and does not appear to be frequented as a recreational area (Solar Millennium 2009a, p. 5.7-13). Furthermore, if not a designated OHV park, Riverside County Ordinance 10.12.010 states a person must have written permission from the property owner in their possession in order to ride their vehicles on the property they are on (Riverside County Sheriff's Department 2010). Therefore, the proposed PSPP would have no direct impacts to lands designated for OHV use and no direct or indirect economic impacts to existing OHV or OHV related equipment industries as a result of the PSPP. For additional discussion regarding potential PSPP related impacts to recreational resources, please refer to the **Land Use, Recreation, and Wilderness** section of this document.

Emergency Medical Services

The closest hospitals to the proposed PSPP site are the Palo Verde Hospital approximately 40 miles east in Blythe, the John F. Kennedy Memorial Hospital approximately 63 miles west in Indio, and the Desert Regional Medical Center approximately 84 miles west in Palm Springs. Palo Verde Hospital provides intensive care/critical/emergency care on site, including four adult intensive-care beds for critically ill patients, and contracts ambulance service to the hospital via private ambulance service providers within Blythe (Solar Millennium 2009a, p. 5.11-21). **Socioeconomics and Environmental Justice Table 7** identifies the nearest emergency medical service facilities to the site and their respective available services.

Socioeconomics and Environmental Justice Table 7
Hospitals and Services Serving the PSPP Site

Palo Verde School District	
Hospital/Address	**Available Services**
Palo Verde Hospital 251 First Street Blythe, California	Hospital, blood bank, computerized tomography scan, intensive care unit, labor/delivery/recovery rooms, magnetic resonance imaging, nuclear medicine, outpatient services, ultrasound.
John F. Kennedy Memorial Hospital 47111 Monroe Street Indio, California	Hospital, cardiac and vascular, healthgrades, orthopedic and arthritis institute, outpatient rehabilitation, women and children, emergency department, free physician referral and community education, emergency and express care.
Desert Regional Medical Center 1150 N. Indian Canyon Drive Palm Springs, California	Hospital, hematologists, pathologists, radiology, general surgeons, emergency medical and surgical service, anesthesiologists, physical therapists, obstetricians, and gynecologists, rehabilitation services.

Source: Solar Millennium 2009a, Table 5.11-13.

Construction. Construction of the proposed PSPP would last 39-months and include an average of 566 daily construction workers, peaking with a daily workforce of 1,141 workers during month 17 of construction (Solar Millennium 2009a, p. 5.11-25). In the event an on-site accident occurred during project construction, both private ambulance service and Riverside County Fire Department firefighters would provide first responder emergency medical care. As discussed in the **WORKER SAFETY AND FIRE PROTECTION** section of this document, the nearest Riverside County Fire Department fire stations available during PSPP construction are staffed full-time, 24 hours/7 days a week, with a minimum 3-person crew, including paramedics. Once transported, as shown above in **Table 7**, a number of local area hospitals are available to provide emergency and express medical care. Therefore, while a high number of construction employees would be located on-site, local area emergency medical facilities are expected to adequately handle any worksite accidents requiring their attention. No additional constraints or physical impacts would occur to the local study area healthcare services or facilities identified in **Table 7** serving the PSPP site.

Operation. The proposed PSPP is expected to require a total of 134 permanent full-time employees (Solar Millennium 2009a, p. 5.11-29). As discussed above for construction, the available emergency medical and hospital facilities identified in **Table 7** and serving

the PSPP site and local study area are expected to adequately handle the permanent addition of 134 on-site staff and the long-term demands of the PSPP. It is possible that up to 34 operational employees could choose to relocate to the PSPP local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, staff assumes this population would be adequately served by the local area emergency medical facilities as these facilities are privately owned and expand based on a supply and demand basis. As discussed in the **Worker Safety and Fire Protection** section of this report, staff proposes the applicant help fund a new fire station in **Worker Safety-7** to mitigate for the direct and cumulative impacts of the project on local fire protection services. It should be noted that this potentially significant impact to fire protection services was determined using the significant thresholds presented in the **Worker Safety and Fire Protection** section, which are independent and differ from those utilized within this **Socioeconomics** section to determine potential impacts to police, school, emergency services, and recreational public services. Please refer to the **Worker Safety and Fire Protection** section of this report for a detailed discussion of fire protection services. However, it is assumed that this new fire facility would be available to serve emergency medical needs during PSPP operation. Therefore, staff concludes that operation of the PSPP is not expected to significantly impact the existing service levels, response times, or capacities of the hospitals serving the PSPP local study area.

Project Closure and Decommissioning

As described in the **Project Description** section of the SA/DEIS, it is assumed the planned operational life of the Project is 30 years, but the facility conceivably could operate for a longer or shorter period depending on economic or other circumstances (Solar Millennium 2009a, p. 3-2). If the PSPP remains economically viable, it could operate for more than 30 years, which would defer environmental impacts associated with closure and with the development of replacement power generating facilities. However, if the facility were to become economically non-viable before 30 years of operation, permanent closure could occur sooner. In any case, a Decommissioning Plan would be prepared at PSPP closure and put into effect when permanent closure occurs (Solar Millennium 2009a, p. 3-2). As in the case of a temporary closure, security for the PSPP will be maintained on a 24-hour basis during permanent closure (Solar Millennium 2009a, p. 3-2). In general, the Project Decommissioning Plan will address: decommissioning measures for the PSPP and all associated facilities; activities necessary for site restoration/revegetation if removal of all equipment and facilities is needed; recycling of facility components, collection and disposal of hazardous wastes, and resale of unused chemicals to other parties; decommissioning alternatives other than full site restoration; costs associated with the planned decommissioning activities and where funding will come from for these activities; and conformance with applicable LORS (Solar Millennium 2009a, p. 3-2).

It is assumed that the number and type of workers required for closure and decommissioning activities would be similar to that described above for construction of the PSPP. Also, it is assumed the closure and decommissioning workforce would be drawn from the regional and local study areas. As all workers are expected to reside within the study area, no impacts to existing population levels are expected to occur. As closure

and decommissioning activities would be temporary in duration with the number of required workers expected to represent a small portion of the local available labor force, no significant impacts to the study area population would result from proposed project closure and decommissioning activities. Furthermore, it is assumed that the regional study area would continue to offer a high number of transient lodging opportunities to serve decommissioning construction employees. Therefore, closure and decommissioning of the proposed PSPP would not result in any direct population growth to the area that could generate a need for new or expanded housing or public service facilities.

Staff cannot speculate as to the long-term economic and fiscal effects that closure and decommissioning activities would have on the study area because future conditions are unknown. Upon permanent closure of the PSPP, the beneficial socioeconomic operational impacts such as worker payroll, project expenditures, and local economic stimulus through taxation would no longer occur. It should be noted that closure and decommissioning of the PSPP would likely require further environmental impact evaluation.

C.8.4.3 CEQA LEVEL OF SIGNIFICANCE

As discussed in the subject headings above, under CEQA, project-related socioeconomic impacts would be less than significant for population, housing, and public services including law enforcement, schools, parks and recreation, and emergency medical services.

C.8.5 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

This alternative is analyzed because:

1. It would retain the 500 MW generation capacity defined for the proposed project and the engineering is defined by Solar Millennium as feasible;
2. It reduces impacts to the primary and secondary desert washes that cross the proposed site; and
3. It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

C.8.5.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the PSPP ROW application area but the alternative would remain entirely within BLM managed lands.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. The setting for Unit 2 would be similar to that for the proposed project.

As only a minor change would occur to the project site, this alterative would have the identical socioeconomic regional and local study areas as the proposed PSPP, as discussed above in Section C.8.4.1.

C.8.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Induce Substantial Population Growth

The population impacts of the Reconfigured Alternative would be similar to those of the proposed PSPP, as described above in Section C.8.5.2. It is possible due to the larger footprint of Unit 1 that construction activities could be increased, but result in identical construction activities as that described above for the proposed PSPP. Therefore, this alternative would result in identical socioeconomic impacts when compared to the proposed PSPP. As the regional study area provides a substantial number of construction workers by type that would adequately provide all required workers for the Reconfigured Alternative as well (refer to **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 4**). Therefore, the Reconfigured Alternative is not considered to result in population inmigration to the local or regional study area from construction activities.

It is assumed that operation of this alternative would require the identical number of operational employees as the PSPP. Therefore it is possible that up to 34 operational employees could choose to relocate to the Reconfigured Alternative local area from more distant regional study area locations. As discussed above, in the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, staff assumes this population would be adequately served by local area available housing, as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3**. Based on these conclusions, staff concludes that operation of the Reconfigured Alternative would not induce substantial population growth in excess of available local study area housing.

Displace Existing Housing

The housing impacts of the Reconfigured Alternative would be identical to those of the proposed PSPP, as described in Section C.8.5.2. As discussed above, this alternative would require approximately 240 acres of the site be outside of the PSPP ROW application area, but the alternative would remain entirely within BLM managed lands. Therefore, because this additional site footprint would be within BLM managed lands, it is assumed that no housing would exist within the additional acreage and required infrastructure ROW. Therefore, the Reconfigured Alternative would not displace any housing during construction or operation. Furthermore, identical to that described for the proposed PSPP, any temporary inmigration from the required construction workforce of the Reconfigured Alternative seeking local housing during the workweek (assumed up to 15%) would not trigger the need for new housing in the local study area. Furthermore, it is assumed all workers would be found in the regional study area.

It is possible that up to 34 operational employees could choose to relocate to the Reconfigured Alternative local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to

permanently relocate to the local study area, staff assumes this population would be adequately served by local area available housing, as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3**. Based on these conclusions, staff concludes that construction and operation of the Reconfigured Alternative would not induce substantial population growth in excess of available local and regional study area housing.

Result in Substantial Physical Impacts to Government Facilities

The public services impacts of the Reconfigured Alternative would be identical to those of the proposed PSPP, as described in Section C.8.5.2. Therefore, as discussed above for the PSPP it is assumed that all required construction workforce of the Reconfigured Alternative would be found in the regional study area and no permanent inmigration would occur. In the event construction workers choose to temporarily seek short-term housing during the workweek (assumed up to 15%), these workers would not impact local public service ratios or capacities similar to that analyzed for the PSPP. Therefore, no new population inmigration would occur from construction that could decrease existing public service provider service levels and ratios, response times, capacities, or require new or expanded facilities serving the Reconfigured Alternative regional or local study areas.

Regarding operations, as this alternative would also be located entirely within BLM lands, no private land or land within the PVUSD 's district would be affected and therefore, the provisions of Education Code Section 17620 would not apply to this alternative (CEC 2010a). As discussed above, it is possible that up to 34 operational employees could choose to relocate to the Reconfigured Alternative local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, it is assumed that some percentage of this population would purchase homes and contribute to the local community through the payment of property taxes. It is assumed the Reconfigured Alternative would pay substantial annual property tax similar to that of the PSPP, as indicated in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**. Furthermore, operational employment impacts to emergency medical services would be identical for this alternative as those discussed above for the PSPP. Based on these conclusions, staff concludes that operation of the Reconfigured Alternative is not expected to significantly impact the existing service levels, response times, or capacities of the police, school, recreational facility, or hospitals serving the Reconfigured Alternative local study area. For a discussion regarding Reconfigured Alternative potential impacts to fire safety resources, please refer to the **Worker Safety and Fire Protection** section of this report.

Cumulative Socioeconomic Effects

The cumulative socioeconomic impacts of the Reconfigured Alternative would be identical to those of the proposed PSPP, as described below in Section C.8.9. As discussed for the PSPP, the regional and local study area provides adequate construction and operational employees for the Reconfigured Alternative and cumulative development projects. While cumulative projects could combine to increase the demand for localized transient lodging and potentially permanent housing in the local study area, staff concludes that local hotel/motel and vacancy rates indicated

ample available housing for an assumed 15% of temporary workers who may choose to stay locally during the workweek. Furthermore, local study area vacancy rates indicate ample permanent housing is available to those operational employees choosing to relocate locally to the site. In the event cumulative relocations occurred to the local study area from operational and indirect/induced employees, it is assumed that at some level the payment of property taxes from cumulative employment relocations purchasing homes would help serve to offset any potential increase in public service demands. Furthermore, the Reconfigured Alternative would likely require property tax similar to that of the PSPP as provided in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**. Therefore, the Reconfigured Alternative would not contribute to adverse cumulative socioeconomic impacts.

C.8.5.3 CEQA LEVEL OF SIGNIFICANCE

As discussed above in subsection C.8.5.2, and similar to the proposed PSPP, impacts resulting from this alternative to socioeconomics would be less than significant**.**

C.8.6 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.8.6.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The Reconfigured Alternative #2 Unit 1 power block would be located approximately 2,700 feet (0.5 miles) south of the location for the proposed project. The setting for Unit 1 would be similar to that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

As only a minor change would occur to the project site, this alterative would have the identical socioeconomic regional and local study areas as the proposed PSPP, as discussed above in Section C.8.4.1.

C.8.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Induce Substantial Population Growth

The population impacts of Reconfigured Alternative #2 would be similar or identical to those of the proposed PSPP, as described above in Section C.8.5.2. It is possible due to the slightly larger footprint of Unit 1 that construction activities could be increased, resulting in a longer overall construction schedule and a potential increase to the number of construction workers. However, this potential change in construction activities would not result in greater socioeconomic impacts when compared to the proposed PSPP as the regional study area provides a substantial number of construction workers by type that would adequately provide all required workers for Reconfigured Alternative #2 as well (refer to **Socioeconomics and Environmental Justice Table 4**). Therefore, the Reconfigured Alternative #2 is not considered to result in population inmigration to the local or regional study area from construction activities.

It is assumed that operation of this alternative would require the identical number of operational employees as the PSPP. Therefore it is possible that up to 34 operational employees could choose to relocate to the Reconfigured Alternative #2 local area from more distant regional study area locations. As discussed above, in the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, staff assumes this population would be adequately served by local area available housing, as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3**. Based on these conclusions, staff concludes that operation of the Reconfigured Alternative #2 would not induce substantial population growth in excess of available local study area housing.

Displace Existing Housing

The housing impacts of Reconfigured Alternative #2 would be similar to those of the proposed PSPP, as described in Section C.8.5.2. As discussed above, this alternative would include a portion of the site be outside of the PSPP ROW application area, but the alternative would remain BLM managed lands and private, undeveloped lands. Based on preliminary site designs for the Reconfigured Alternative #2, no housing would exist within the additional acreage and required infrastructure ROW. Therefore, Reconfigured Alternative #2 would not displace any housing during construction or operation. Furthermore, identical to that described for the proposed PSPP, any temporary inmigration from the required construction workforce of the Reconfigured Alternative #2 seeking local housing during the workweek (assumed up to 15%) would not trigger the need for new housing in the local study area. Furthermore, it is assumed all workers would be found in the regional study area.

It is possible that up to 34 operational employees could choose to relocate to the Reconfigured Alternative #2 local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to

permanently relocate to the local study area, staff assumes this population would be adequately served by local area available housing, as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3**. Based on these conclusions, staff concludes that construction and operation of the Reconfigured Alternative #2 would not induce substantial population growth in excess of available local and regional study area housing.

Result in Substantial Physical Impacts to Government Facilities

The public services impacts of Reconfigured Alternative #2 would be similar or identical to those of the proposed PSPP, as described in Section C.8.5.2. Therefore, as discussed above for the PSPP it is assumed that all required construction workforce of the Reconfigured Alternative #2 would be found in the regional study area and no permanent inmigration would occur. In the event construction workers choose to temporarily seek short-term housing during the workweek (assumed up to 15%), these workers would not impact local public service ratios or capacities similar to that analyzed for the PSPP. Therefore, no new population inmigration would occur from construction that could decrease existing public service provider service levels and ratios, response times, capacities, or require new or expanded facilities serving the Reconfigured Alternative #2 regional or local study areas.

Regarding operations, this alternative would include private land outside of that controlled by the BLM. Therefore, a portion of Reconfigured Alternative #2 may be subject to the provisions of Education Code Section 17620. In the event this alternative was selected for development, any development fees payable to the PVUSD would be assessed at that time. As discussed above, it is possible that up to 34 operational employees could choose to relocate to the Reconfigured Alternative #2 local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, it is assumed that some percentage of this population would purchase homes and contribute to the local community through the payment of property taxes. It is assumed the Reconfigured Alternative #2 would require annual property tax similar to that of the PSPP, as indicated in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**. Furthermore, operational employment impacts to emergency medical services would be identical for this alternative as those discussed above for the PSPP. Based on these conclusions, staff concludes that operation of the Reconfigured Alternative #2 is not expected to significantly impact the existing service levels, response times, or capacities of the police, school, recreational facility, or hospitals serving the Reconfigured Alternative #2 local study area. For a discussion regarding Reconfigured Alternative #2 potential impacts to fire safety resources, please refer to the **Worker Safety and Fire Protection** section of this report.

Cumulative Socioeconomic Effects

The cumulative socioeconomic impacts of the Reconfigured Alternative #2 would be similar or identical to those of the proposed PSPP, as described below in Section C.8.9. As discussed for the PSPP, the regional and local study area provides adequate construction and operational employees for the Reconfigured Alternative #2 and cumulative development projects. While cumulative projects could combine to increase the demand for localized transient lodging and potentially permanent housing in the

local study area, staff concludes that local hotel/motel and vacancy rates indicated ample available housing for an assumed 15% of temporary workers who may choose to stay locally during the workweek. Furthermore, local study area vacancy rates indicate ample permanent housing is available to those operational employees choosing to relocate locally to the site. In the event cumulative relocations occurred to the local study area from operational and indirect/induced employees, it is assumed that at some level the payment of property taxes from cumulative employment relocations purchasing homes would help serve to offset any potential increase in public service demands. As discussed above, the Reconfigured Alternative #2 may be subject to a one time school impact fee payable to the PVUSD. Furthermore, the Reconfigured Alternative #2 would likely require property tax similar to that of the PSPP as provided in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**. Therefore, the Reconfigured Alternative #2 would not contribute to adverse cumulative socioeconomic impacts.

C.8.6.3 CEQA LEVEL OF SIGNIFICANCE

As discussed above in subsection C.8.5.2, and similar to the proposed PSPP, impacts resulting from this alternative to socioeconomics would be less than significant**.**

C.8.7 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.8.7.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern half of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located on primarily on public land managed by BLM; however, as with the proposed project, it include a 40 acre private parcel on which the applicant has a purchase option. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The Reconfigured Alternative #3 Unit 1 power block would be located approximately 2,700 feet (0.5 miles) south of the location for the proposed project. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

As only a minor change would occur to the project site, this alterative would have the identical socioeconomic regional and local study areas as the proposed PSPP, as discussed above in Section C.8.4.1.

C.8.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Induce Substantial Population Growth

The population impacts of Reconfigured Alternative #3 would be similar or identical to those of the proposed PSPP, as described above in Section C.8.5.2. It is possible due to the slightly larger footprint of Unit 1 that construction activities could be increased, resulting in a longer overall construction schedule and a potential increase to the number of construction workers. However, this potential change in construction activities would not result in greater socioeconomic impacts when compared to the proposed PSPP as the regional study area provides a substantial number of construction workers by type that would adequately provide all required workers for Reconfigured Alternative #3 as well (refer to **Socioeconomics and Environmental Justice Table 4**). Therefore, the Reconfigured Alternative #3 is not considered to result in population inmigration to the local or regional study area from construction activities.

It is assumed that operation of this alternative would require the identical number of operational employees as the PSPP. Therefore it is possible that up to 34 operational employees could choose to relocate to the Reconfigured Alternative #3 local area from more distant regional study area locations. As discussed above, in the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, staff assumes this population would be adequately served by local area available housing, as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3**. Based on these conclusions, staff concludes that operation of the Reconfigured Alternative #3 would not induce substantial population growth in excess of available local study area housing.

Displace Existing Housing

The housing impacts of Reconfigured Alternative #3 would be similar to those of the proposed PSPP, as described in Section C.8.5.2. As discussed above, this alternative would include a portion of the site be outside of the PSPP ROW application area, but the alternative would remain BLM managed lands and private, undeveloped lands. Based on preliminary site designs for the Reconfigured Alternative #3, no housing would exist within the additional acreage and required infrastructure ROW. Therefore, Reconfigured Alternative #3 would not displace any housing during construction or operation. Furthermore, identical to that described for the proposed PSPP, any temporary inmigration from the required construction workforce of the Reconfigured Alternative #3 seeking local housing during the workweek (assumed up to 15%) would not trigger the need for new housing in the local study area. Furthermore, it is assumed all workers would be found in the regional study area.

It is possible that up to 34 operational employees could choose to relocate to the Reconfigured Alternative #3 local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, staff assumes this population would be adequately served by local area available housing, as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3**. Based on these conclusions, staff concludes that construction and operation of the Reconfigured Alternative #3 would not induce substantial population growth in excess of available local and regional study area housing.

Result in Substantial Physical Impacts to Government Facilities

The public services impacts of Reconfigured Alternative #3 would be similar or identical to those of the proposed PSPP, as described in Section C.8.5.2. Therefore, as discussed above for the PSPP it is assumed that all required construction workforce of the Reconfigured Alternative #3 would be found in the regional study area and no permanent inmigration would occur. In the event construction workers choose to temporarily seek short-term housing during the workweek (assumed up to 15%), these workers would not impact local public service ratios or capacities similar to that analyzed for the PSPP. Therefore, no new population inmigration would occur from construction that could decrease existing public service provider service levels and ratios, response times, capacities, or require new or expanded facilities serving the Reconfigured Alternative #3 regional or local study areas.

Regarding operations, this alternative would include private land outside of that controlled by the BLM. Therefore, a portion of Reconfigured Alternative #3 may be subject to the provisions of Education Code Section 17620. In the event this alternative was selected for development, any development fees payable to the PVUSD would be assessed at that time. As discussed above, it is possible that up to 34 operational employees could choose to relocate to the Reconfigured Alternative #3 local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, it is assumed that some percentage of this population would purchase homes and contribute to the local community through the payment of property taxes. It is assumed the Reconfigured Alternative #3 would require annual property tax similar to that of the PSPP, as indicated in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**. Furthermore, operational employment impacts to emergency medical services would be identical for this alternative as those discussed above for the PSPP. Based on these conclusions, staff concludes that operation of the Reconfigured Alternative #3 is not expected to significantly impact the existing service levels, response times, or capacities of the police, school, recreational facility, or hospitals serving the Reconfigured Alternative #3 local study area. For a discussion regarding Reconfigured Alternative #3 potential impacts to fire safety resources, please refer to the **Worker Safety and Fire Protection** section of this report.

Cumulative Socioeconomic Effects

The cumulative socioeconomic impacts of the Reconfigured Alternative #3 would be similar or identical to those of the proposed PSPP, as described below in Section C.8.9. As discussed for the PSPP, the regional and local study area provides adequate

construction and operational employees for the Reconfigured Alternative #3 and cumulative development projects. While cumulative projects could combine to increase the demand for localized transient lodging and potentially permanent housing in the local study area, staff concludes that local hotel/motel and vacancy rates indicated ample available housing for an assumed 15% of temporary workers who choose to stay locally during the workweek. Furthermore, local study area vacancy rates indicate ample permanent housing is available to those operational employees choosing to relocate locally to the site. In the event cumulative relocations occurred to the local study area from operational and indirect/induced employees, it is assumed that at some level the payment of property taxes from cumulative employment relocations purchasing homes would help serve to offset any potential increase in public service demands. As discussed above, the Reconfigured Alternative #3 may be subject to a one time school impact fee payable to the PVUSD. Furthermore, the Reconfigured Alternative #3 would likely require property tax similar to that of the PSPP as provided in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**. Therefore, the Reconfigured Alternative #3 would not contribute to adverse cumulative socioeconomic impacts.

C.8.7.3 CEQA LEVEL OF SIGNIFICANCE

As discussed above in subsection C.8.5.2, and similar to the proposed PSPP, impacts resulting from this alternative to socioeconomics would be less than significant**.**

C.8.8 REDUCE ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be about 25% smaller, occupying about 2,080 acres of land (as compared with 2,740 acres required for the proposed project). The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**. The Reduce Acreage Alternative would result in an approximately 375 MW project.

This alternative is analyzed for several reasons:

- It would eliminate about 25% of the proposed project's area so all impacts would be reduced;
- It would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 1;
- It would reduce impacts to primary and secondary desert washes crossing the proposed site; and
- It would reduce impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley aeolian sand corridor, and the Mojave Fringe-Toed Lizard by prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields.

C.8.8.1 SETTING AND EXISTING CONDITIONS

The Reduced Acreage Alternative would incorporate the following changes from the Reconfiguration Alternative:

- It would modify the boundaries of Unit 1 as follows:
- Preclude the use of the northeastern quarter of the westernmost solar field;
- Reduce and revise the easternmost solar field to avoid the dune habitat; and
- It would result in approximately 803 acres or approximately 55% of the Reconfigured Alternative Unit 1 (1,467 acres).
- It would preclude the use of the northern half of the easternmost solar field of Unit 1 (368 acres), retaining only the southern half of this field.
- It would modify the boundaries of Unit 2 as follows:
  - Eliminate the southernmost segment of Unit 2 (170 acres within Desert Tortoise Critical Habitat)
  - Eliminate the northernmost area of Unit 2 (260 acres of dune sands and MFTL habitat)
  - Add 215 acres to the western end of the second and third rows of solar trough loops to make up for some of the reductions described above.

As such, the setting for the Reduced Acreage Alternative is the same as for the Reconfigured Alternative with the exception of the changes addressed above. As the reduced project footprint would not result in a change to the overall site location, this alterative would have the identical socioeconomic regional and local study areas as the proposed PSPP, as discussed above in Section C.8.4.1.

C.8.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Induce Substantial Population Growth

The population impacts of the Reduced Acreage Alternative would be similar to those of the proposed PSPP, as described above in Section C.8.5.2. It is possible due to the smaller footprint of the site that construction activities could be decreased, resulting in a shorter overall construction schedule and a potential decrease to the number of construction workers. Therefore, any construction workers required for the Reduced Acreage Alternative that could seek temporary local housing during the workweek would be reduced as that compared to the proposed PSPP. As local hotel/motel and vacancy rates indicated ample temporary housing for these workers, and that all workers are expected to come from within the regional study area, the Reduced Acreage Alternative would not result in population inmigration to the local or regional study area.

It is assumed that operation of this alternative would require a similar number of operational employees as compared to the PSPP. Therefore, it is likely that up to 34 operational employees could choose to relocate to the Reduced Acreage Alternative local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, staff assumes this population would be adequately served by local area available housing, as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3**. Based on these conclusions, staff concludes that operation of the

Reduced Acreage Alternative would not induce substantial population growth in excess of available local study area housing.

Displace Existing Housing

The housing impacts of the Reconfigured Alternative would be identical to those of the proposed PSPP, as described in Section C.8.5.2. As discussed above, this alternative would simply reduce the footprint of the proposed PSPP site. Therefore, as discussed above for the PSPP, no housing would exist within the alternative site and required infrastructure ROW. Therefore, the Reduced Acreage Alternative would not displace any housing during construction or operation.

Local hotel/motel and vacancy rates indicated ample temporary housing for an assumed maximum of 15% of construction workers that may seek temporary local housing during the workweek. It is possible that up to 34 operational employees could choose to relocate to the Reduce Acreage Alternative local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, staff assumes this population would be adequately served by local area available housing, as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 3**. Based on these conclusions, staff concludes that construction and operation of the Reduced Acreage Alternative would not induce substantial population growth in excess of available local and regional study area housing.

Result in Substantial Physical Impacts to Government Facilities

The public services impacts of the Reconfigured Alternative would be similar to those of the proposed PSPP, as described in Section C.8.5.2. As discussed for the PSPP, it is assumed that all required construction workforce of the Reduced Acreage Alternative would be found in the regional study area and no permanent inmigration would occur. In the event construction workers choose to temporarily seek short-term housing during the workweek (assumed up to 15%), these workers would not impact local public service ratios or capacities similar to that analyzed for the PSPP. Therefore, no new population inmigration would occur from construction that could decrease existing public service providers service levels and ratios, response times, capacities, or require new or expanded facilities serving the Reduced Acreage Alternative regional or local study areas.

Regarding operations, as this alternative would also be located entirely within BLM lands, no private land or land within the PVUSD 's district would be affected and therefore, the provisions of Education Code Section 17620 would not apply to this alternative (CEC 2010a). In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, it is assumed that some percentage of this population would purchase homes and contribute to the local community through the payment of property taxes. It is assumed the Reduced Acreage Alternative would require annual property tax similar to that of the PSPP, as indicated in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**. Any potential reduction in property tax paid by this alternative would be offset by the direct reduction in operational employees that could choose to relocate to the Reduced Acreage Alternative local area. Furthermore, operational employment impacts to

emergency medical services would be similar or less for this alternative as those discussed above for the PSPP. Based on these conclusions, staff concludes that operation of the Reduced Acreage Alternative is not expected to significantly impact the existing service levels, response times, or capacities of the police, school, recreational facility, or hospitals serving the Reduced Acreage Alternative local study area. For a discussion regarding Reduced Acreage Alternative potential impacts to fire safety resources, please refer to the **Worker Safety and Fire Protection** section of this report.

Cumulative Socioeconomic Effects

The cumulative socioeconomic impacts of the Reduced Acreage Alternative would be similar to those of the proposed PSPP, as described below in Section C.8.9. While this alternative could result in a decrease in construction schedule and required workforce, the regional and local study area would continue to provide adequate construction and operational employees for the Reduced Acreage Alternative and cumulative development projects. While cumulative projects could combine to increase the demand for localized transient lodging (during construction) and potentially permanent housing (from operations) in the local study area, local study area vacancy rates indicate ample temporary and permanent housing is available to those construction workers seeking temporary housing during the workweek and operational employees choosing to relocate locally to the site. In the event any direct operational employees or indirect/induced employees were to permanently relocate to the local study area, it is assumed that some percentage of this population would purchase homes and contribute to the local community through the payment of property taxes. Furthermore, the Reduced Acreage Alternative would pay property taxes slightly reduced from those indicated for the PSPP in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**. Therefore, the Reduced Acreage Alternative would not contribute to adverse cumulative socioeconomic impacts.

C.8.8.3 CEQA LEVEL OF SIGNIFICANCE

As discussed above in subsection C.8.6.2, and similar to the proposed PSPP, impacts resulting from this alternative to socioeconomics would be less than significant**.**

C.8.9 NO ACTION ALTERNATIVE

The No Project Alternative under CEQA or the No Action Alternative under NEPA defines the scenario that would exist if the proposed project were not constructed. The CEQA Guidelines state that “the purpose of describing and analyzing a ‘no project’ alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project” (Cal. Code Regs., tit. 14 § 15126.6(i)). The No Project analysis in this RSA considers existing conditions and “what would be reasonably expected to occur in the foreseeable future if the project were not approved…” (Cal. Code Regs, tit. 14 § 15126.6(e)(2)). Under NEPA, the No Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives.

If the No Project/No Action Alternative were selected, the construction and operational impacts of the proposed project would not occur. There would be no grading of the site,

no loss of resources or disturbance of approximately 5,000 acres of desert habitat, no impacts to cultural resources, and no installation of power generation and transmission equipment. The No Project/No Action Alternative would also eliminate contributions to cumulative impacts on a number of resources and environmental parameters in Riverside County and in the Colorado Desert as a whole.

In the absence of the PSPP, however, other power plants, both renewable and non-renewable, would have to be constructed to serve the demand for electricity and to meet RPS. If the No Project/No Action Alternative were chosen, other utility-scale solar power facilities may be built, and the impacts to the environment may be similar to those of the proposed project because these technologies require large amounts of land like that required for the PSPP. The No Project/No Action Alternative may also lead to siting of other non-solar renewable technologies to help achieve the California RPS.

Additionally, if the No Project/No Action 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 proposed project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide, and SCE would not receive the 500 MW contribution to its renewable state-mandated energy portfolio.

There are three No Project/No Action Alternatives evaluated in this section, as follows:

- No Project/No Action Alternative #1: No Action PSPP application and on CDCA land use plan amendment
- No Project/No Action Alternative #2: No Action on PSPP and amend the CDCA land use plan to make the area available for future solar development
- No Project/No Action Alternative #3: No Action on PSPP application and amend the CDCA land use plan to make the area unavailable for future solar development

C.8.9.1 SETTING AND EXISTING CONDITIONS

The No Project analysis in this SA/EIR considers existing conditions and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (Cal. Code Regs, tit. 14 § 15126.6(e)(2)). Under NEPA, the No Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives. The socioeconomic setting for the No Project/No Action Alternative would be the same as those of the proposed project local and regional study areas, as described above in Subsection C.8.4.2.

C.8.9.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

There are three No Project/No Action Alternatives evaluated in this section, as follows:

No Project/No Action Alternative #1:

No Action on Palen Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed PSPP would not be approved by the CEC and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the socioeconomics impacts of the PSPP and the gross public benefits, including capital costs, construction and operation payroll and sales taxes, would not occur at the proposed site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

No Project/No Action Alternative #2

No Action on Palen Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed PSPP would not be approved by the CEC and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, it is expected that the socioeconomics impacts and the gross public benefits, including capital costs, construction and operation payroll and sales taxes, from the construction and operation of a different solar project would likely be similar to the socioeconomic impacts and benefits from the proposed project. As such, this No Project/No Action Alternative could result in socioeconomic impacts and benefits similar to the impacts under the proposed project.

No Project/No Action Alternative #3

No Action on Palen Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed PSPP would not be approved by the CEC and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As such, this No Project/No Action Alternative would not result in socioeconomics impacts nor would it provide the gross public benefits, including capital costs, construction and

operation payroll and sales taxes from the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.8.9.3 CEQA LEVEL OF SIGNIFICANCE

Given that there would be no significant change over the existing conditions, impacts to socioeconomic resources of the No Project/No Action alternative would be less than significant. However, under the No Project/No Action alternative, the socioeconomic benefits to the local and regional study areas associated with the proposed project would not occur and the development of other energy generating projects could result in adverse socioeconomic impacts.

C.8.10 PROJECT RELATED FUTURE ACTIONS

In order to transmit the power generated at the PSPP to the electricity grid, a new substation is required. Southern California Edison Company (SCE) will construct and operate the substation, which will allow the electricity to be carried by the Devers-Palo Verde No. 1 (DPV1) 500 kV transmission line.

The SCE Red Bluff Substation is a reasonably foreseeable project if the PSPP is approved and constructed as proposed. Therefore, this section examines the potential impacts of the construction and operation of the proposed substation. This substation would allow interconnection of the PSPP and other renewable projects in the Desert Center area.

The SCE Red Bluff Substation project will be fully evaluated in a future EIS prepared by the BLM. Because detailed design information is not yet available for the Red Bluff Substation, the impact analysis presented here is based on available information. The purpose of this analysis is to inform the Energy Commission and BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the PSPP.

The project components and construction activities associated with this substation are described in Section B.3 of this Revised Staff Assessment, and a map of its location is presented as **Figure B.3-1**. This analysis examines the construction and operational impacts of a 230/500 kV substation that would be located on approximately 90 acres, south of Interstate 10 and southeast of Desert Center. Substation components will include 230 kV and 500 kV lines, 230/ 500 kV transformer banks, associated switchracks, and a microwave tower. The substation would be located in an existing CDCA utility corridor, north of and adjacent to the existing DPV1 500 kV transmission line.

C.8.10.1 ENVIRONMENTAL SETTING

The SCE Red Bluff Substation would be located in the Chuckwalla Valley in eastern Riverside County. The regional setting for socioeconomics, including demographics and public services for Riverside County is presented above in Section C.8.4.

C.8.10.2 ENVIRONMENTAL IMPACTS

Few, if any, workers are expected to relocate to the local area during project construction. As a result, no new housing would be needed for the project, no housing would be displaced, and no new competition for existing housing would likely occur. Construction employees would likely live within commuting distance to the project area in Riverside County. Temporary accommodations may also be needed during construction, but with numerous hotels and motels in the area, impacts are expected to be less than significant, and mitigation measures are not required. As discussed above, numerous hotels are available in the Blythe area to serve transient workers.

Because it is unlikely that construction workers would permanently move to the area, no impacts to public services would occur due to an influx of new residents. There would not likely be children added to local schools, so impacts on school services would not result from substation construction. Likewise no significant impacts to law enforcement, recreational facilities, and emergency medical services are expected to occur during construction and operation.

Environmental Justice. There are no residences within 1,000 feet of the Red Bluff Substation site. Due to the localized impacts associated with construction and operation of this substation, it is unlikely that the SCE substation would have disproportionately adverse human health or environmental impacts on minority or low-income populations in the affected area.

C.8.10.3 MITIGATION

Socioeconomic impacts from the SCE Red Bluff Substation would be less than significant. No mitigation is recommended.

C.8.10.4 CONCLUSION

Impacts related to socioeconomics and minority and low-income populations related to the SCE Red Bluff Substation would be less than significant.

C.8.11 CUMULATIVE IMPACTS

A project may result in significant adverse cumulative impacts when 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, or the effects of probable future projects (Title 14, California Code of Regulations, section 15130). Cumulative socioeconomics impacts could occur when more than one project has an overlapping construction schedule that creates a demand for workers that cannot be met by the local labor force, resulting in an influx of non-local workers and their dependents. Operational cumulative socioeconomic impacts could occur when the development of multiple projects significantly impacts the population of an area thus resulting in a housing shortage, change in local employment conditions, and an increased demand on public services.

Section B.3, Cumulative Scenario, provides detailed information on the potential cumulative solar and other development projects in the project area. Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed project. In summary, these projects are:

- Renewable energy projects on BLM, State, and private lands, as shown on **Cumulative Scenario Figure 1** and in **Cumulative Scenario Tables 1A and 1B.** Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable projects currently proposed in California.
- Foreseeable future projects in the project area, as shown on **Cumulative Scenario Figure 2, I-10 Corridor Existing and Future/Foreseeable Projects, and Cumulative Scenario Tables 2 and 3**. Table 2 presents existing projects in this area and Table 3 presents future foreseeable projects in the I-10 Corridor Area. Both tables indicate project name and project type, its location and its status.

These projects are defined within a geographic area that has been identified by the CEC and BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under CEQA and/or NEPA. Even if the cumulative projects described in Section B.3 have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this RSA.

Geographic Extent of Cumulative Impact Analysis

The area of cumulative effect for socioeconomic resources is Riverside and San Bernardino Counties, CA and La Paz County, AZ. The analysis of cumulative effects considers a number of variables including geographic (spatial) limits, time (temporal) limits, and the characteristics of the resource being evaluated. The geographic scope of cumulative impact analysis is based on the workforce boundaries of the cumulative development projects. While it is possible that the geographic scope of cumulative effects will extend beyond these three counties, with some workers potentially coming from adjacent counties beyond a two-hour commute radius of the proposed PSPP site, due the similar nature of skill set required by the workforce during construction activities, as well as the number of proposed cumulative renewable energy projects, it is not anticipated that the geographic scope for cumulative impact analysis extent beyond the scope of the direct and indirect effects of the proposed action.

Cumulative Impact Types

The PSPP cumulative analysis will separately assess cumulative impacts of the following two categories of cumulative projects:

- Existing cumulative conditions
- Future foreseeable projects

Effects of Past and Present Projects

A wide variety of past and present development projects contribute to the cumulative conditions for socioeconomics. As noted above in the “Setting and Existing Conditions”

subsection, past development has further urbanized the area and increased population, housing, and employment conditions. As shown in the AFC, from 2000 to 2008 the populations of Riverside and San Bernardino Counties increased by 25.6 and 16.2%, respectively while the population within La Paz County increased by 8.5% during the same time frame (Solar Millennium 2009a, p. 5.11-6). This is an example of the steady growth rate that has occurred throughout the regional study area. As a result, past and present residential, commercial, and industrial development has contributed to the overall socioeconomic growth within the study area.

Effects of Future Foreseeable Projects

Socioeconomics are also expected to be affected by the following reasonably foreseeable future projects as follows: a number of large electrical generation and distribution infrastructure development projects are proposed along the I-10 corridor (as shown in **Cumulative Scenario Figure 2** and **Cumulative Scenario Table 3**); and solar and wind applications proposed on approximately 1,000,000 acres of BLM land in the California Desert District Planning Area as well as a large number of electrical generation and distribution infrastructure development projects proposed on non-federal land in the I-10 corridor (as shown in **Cumulative Scenario Table 1b**, **Cumulative Scenario Figure 1,** and **Cumulative Scenario Table 1a**).

Contribution of the Palen Solar Power Project to Cumulative Impacts

Construction. Foreseeable development in the project area includes primarily renewable energy electrical generation and transmission infrastructure projects. With the large number of renewable energy projects occurring within the PSPP regional study area, it is possible that some overlap of construction phasing could occur between the PSPP and the cumulative development projects. **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 8** presents the most recently published data (Year 2006-2016 projections) on labor force characteristics for the cumulative regional study area pertaining to electrical energy project construction labor skill sets and compares those to major cumulative projects located near the PSPP along the I-10 corridor, including the Blythe Solar Energy Project (BSPP), Genesis Solar Power Project (GSEP), Rice Solar Energy Project (RSEP), and the Desert Sunlight PV Project (DSPV).

SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 8
Cumulative Project Construction Employment Needs

Trade	PSPP Total # of Workers for Project Construction by Craft – Peak Month (Month 17)	BSPP Total # of Workers for Project Construction by Craft – Peak Month (Month 16)	GSEP Total # of Workers for Project Construction by Craft – Peak Month (Month 16)	RSEP Total # of Workers for Project Construction by Craft – Peak Month (Month 12)	DSPV Total # of Workers for Project Construction by Craft – Peak Month (Months 6-8)	*TOTAL*	Riverside/San Bernardino/ Ontario MSA 2006	Riverside/San Bernardino/ Ontario MSA 2016
Surveyor	12	16	0	0	N/A	*28*	1,420	1,670
Operator	90	94	0	0	N/A	*184*	4,790	5,460
Laborer	185	229	198	52	N/A	*637*	27,930[1]	32,080[1]
Truck Driver	35	28	0	0	N/A	*63*	27,930[1]	32,080[1]
Oiler	4	4	0	0	N/A	*8*	27,930[1]	32,080[1]
Carpenter	100	77	44	50	N/A	*300*	28,850	32,390
Boilermaker	11	9	0	0	N/A	*20*	4,630[2]	5,330[2]
Paving Crew	0	0	0	0	N/A	*0*	630	720
Pipe Fitter	326	290	200	80	N/A	*968*	4,630	5,330
Electrician	150	81	105	56	N/A	*449*	6,740	7,600
Cement Finisher	100	80	4	6	N/A	*197*	4,110	4,690
Ironworker	59	42	70	32	N/A	*246*	19,460	20,800
Millwright	25	18	22	16	N/A	*153*	2,630[3]	2,960[3]
Tradesman	10	8	382[6]	105[7]	N/A	*544*	27,930[1]	32,080[1]
Project Manager	3	2	0	0	N/A	*5*	10,990[4]	12,380[4]
Construction Manager	3	2	0	5	N/A	*10*	4,380	5,110
PM Assistant	4	2	0	0	N/A	*6*	10,990[4]	12,380[4]
Support	4	2	0	0	N/A	*6*	120[5]	130[5]
Support Assistant	4	2	0	0	N/A	*6*	120[5]	130[5]
Engineer	10	7	60	36	N/A	*127*	1,370	1,600
Timekeeper	3	2	0	0	N/A	*5*	10,990[4]	12,380[4]
Administrator	6	5	0	0	N/A	*11*	10,990[4]	12,380[4]
Welder	1	1	0	0	N/A	*2*	3,960	4,640
Total Peak Month	*1,145*	*1,001*	*1,085*	*438*	*622*	*4,291*	--	--
Local Housing Need[10]	*172*	*150*	*163*	*0[11]*	*93*	*578*	--	--

Notes: [1] The "Construction Laborers" category was used; [2] The "Plumbers, Pipefitters, and Steamfitters" category was used; [3] The "Machinists" category was used; [4] The "Supervisors, Construction and Extraction Workers" category was used; [5] The "Helpers-Construction Trades" category was used; [6] Includes: insulators, painters, teamsters, and 'Solar Field Craft". The solar field craft workers include an estimated five solar field installation crews, with each crew including a Foreman, Equipment Operators, Laborers, Electricians, Ironworkers, Carpenters, Masons, and Pipefitter/Welders; [7] Includes Teamesters, Heliostat Assembly Craft, Construction Staff, Subcontractors, and Technical Advisors; [8] Includes Insulators; [9] Includes Painters, Sheetmetal Workers, and Teamsters; [10] Assumes 15% of peak month workforce may seek temporary local housing during workweek; [11] On-site worker camp is provided for RSEP, providing housing for up to 300 trailers, eliminating local housing need; N/A: labor by craft data not available from BLM.
Source: Solar Millennium 2009a and b, GSEP 2009a, SR 2009a, and BLM 2010c.

All cumulative projects identified in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 8** would be expected to draw on the large regional construction workforce in and around Riverside/San Bernardino/Ontario MSA, and as shown the MSA offers sufficient regional labor by skill set to staff all projects from within the regional study area. As indicated by **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 8**, cumulative development of these projects in a worst-case scenario of overlapping peak period months could result in the influx of 578 construction workers seeking local lodging within the area as a result of the large renewable energy projects being constructed. Staff concludes this scenario unlikely due to construction scheduling and peak months shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 8**, and notes that this assumption does not account for workers doubling up in local lodging situations.

While this number could impact the amount of local hotel/motel rooms within the local and regional study area, as discussed above for the proposed PSPP a high number of short-term housing units are available within increasing radii commute sheds from the local study area. Furthermore, local housing is available within the cities of Ehrenburg and Quartzsite, AZ. While staff acknowledges that cumulatively workers seeking short-term temporary housing during the workweek to avoid commuting from their homes in the regional study area could increase housing demand and population in the local area, the extent and quantification of these impacts is unknown and speculative. Staff also concludes that like the PSPP, workers seeking RV and campsite lodging from cumulative projects will likely find no availability within the winter months.Based on the availability of local temporary housing within a one-hour commute shed (as discussed above for the PSPP), it is assumed that ample temporary short-term housing is available for any workers seeking short-term local lodging from a cumulative perspective. Therefore, staff concludes that cumulative project construction within the PSPP local study area would not significantly impact the population projections or require the need for new or expanded housing within the local study area.

Furthermore, as staff concludes that all workers associated with the cumulative projects identified within **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 8** will come from within the regional study area, with up to 15% of these workers potentially seeking short-term temporary housing during the workweek locally, cumulative construction activities would not require the need for new or expanded public services (police, schools, recreation, hospitals) serving the local study area as no permanent population increase would occur. While **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 8** indicates that cumulative development based on staff assumptions could result in up to 578 workers staying within the local study area, as staff concludes this number would fluctuate and it is speculative to quantify any potential impacts this could have on local area public services. Therefore, staff concludes construction of the PSPP would not contribute to adverse cumulative socioeconomic impacts.

In addition, short-term construction-related spending activities of the PSPP project are expected to have cumulative economic benefits for the study area (refer below to **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10**). The cumulative benefits would increase when revenues accrued as a result of the proposed PSPP are

combined with spending, and any local revenues accrued as a result of current and future reasonably foreseeable cumulative development projects.

Operation. Operation of the PSPP is expected to result in the potential permanent relocation of up to 34 workers into the local study area. **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 9** presents the most recently published data (Year 2006-2016 projections) on labor force characteristics for the cumulative regional study area pertaining to electrical energy project operational labor skill sets and compares those to major cumulative projects located near the PSPP along the I-10 corridor, including the GSEP, BSPP, RSEP, and the DSPV.

As shown in **Table 9**, these cumulative projects are expected to result in a total of 138 workers permanently relocating to the local study area. Staff acknowledges that indirect and induced employment from all cumulative projects identified in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 9** could result in limited demand for permanent housing in the local study area. However, staff cannot speculate or quantify this potential at the time of publication. However, it is assumed that the vacancy rate of the local and regional study area (as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE TABLES 2** and **3**) could adequately provide housing for any potential portion of indirect and induced employment population that may permanently relocate to the local study area from cumulative development and this population would be within projections for the regional study area (as shown in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE TABLE 2**).

Decommissioning. The decommissioning of the PSPP is expected to result in similar cumulative impacts related to socioeconomics as PSPP construction impacts, as described above. It is unknown if the construction or decommissioning of any of the cumulative projects would occur concurrently with the decommissioning of this project, because the decommissioning is not expected to occur for approximately 30 years. As a result, it is unknown if any cumulative impacts related to socioeconomics could occur during decommissioning of the PSPP. However, based on the cumulative impact analysis above for PSPP construction activities, it is likely the impacts of the decommissioning of the PSPP would not be expected to contribute to cumulative impacts related to socioeconomics because it is assumed the closure and decommissioning workforce would be drawn from the regional and local study areas. However, impacts to existing population levels, housing, or public services are unknowable at this time that would occur from short-term decommissioning construction activities 30 years in the future.

SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 9
Cumulative Project Operational Employment Needs

Trade	PSPP Total # of Workers for Project Operation	BSPP Total # of Workers for Project Operation	GSEP Total # of Workers for Project Operation	RSEP Total # of Workers for Project Operation	DSPV Total # of Workers for Project Operation	*TOTAL*	Riverside/San Bernardino/ Ontario MSA 2006	Riverside/San Bernardino/ Ontario MSA 2016
Plant and System Operators	--	--	--	--	--	--	2,030	2,380
Power Plant Operators	--	--	--	--	--	--	310	370
Total	*134*	*221*	*50*	*47*	*15*	*467*	*2,340*	*2,750*
Local Housing Need[1]	*34*	*55*	*33*	*12*	*4*	*138*	--	--

[1] BSPP and PSPP use a 25% relocation assumption in their respective AFC's. As no assumed percentage was included in the RSEP AFC and DSPV information provided by BLM, this table assumes 25% of operational employees will permanently relocate to the cumulative project area. GSEP AFC specifically indicates that up to 33 workers would relocate.
Source: Solar Millennium 2009a and b, GSEP 2009a, SR 2009a, and BLM 2010c.

C.8.12 COMPLIANCE WITH LORS

As the PSPP and all proposed alternatives would be located entirely within BLM lands, no private land would be affected and therefore, the provisions of Education Code Section 17620 would not apply (CEC 2010a). Therefore, the PSPP and all proposed alternatives, as proposed, are consistent with applicable Socioeconomic LORS, as identified in **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 1.**

C.8.13 NOTEWORTHY PUBLIC BENEFITS

Important public benefits include both the short-term construction and long-term operational related increases in local expenditures and payrolls, as well as sales tax revenues. Estimated gross public benefits from the PSPP include increases in sales taxes and employment payrolls. **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE Table 10** provides a summary of economic and employment benefits of the PSPP.

Socioeconomics and Environmental Justice Table 10
PSPP Economic Benefits (2009 dollars)

Fiscal Benefits	
Estimated annual property taxes	$200,000[1]
State and local sales taxes: Construction	$805,000
State and local sales taxes: Operation	$437,500
School Impact Fee	$0
Non-Fiscal Benefits	
Construction materials and supplies	$30.0 million
Operations and maintenance supplies	$5.0 million
Direct, Indirect, and Induced Benefits	
Estimated Direct Employment	
Construction	566 jobs (annual full-time equivalent over full 39-month construction phase)
Income	$218.7 million (total over full 39-month construction phase)
Operation	134 jobs
Income	$5.8 million (annual)
Estimated Indirect Employment	
Construction	291 jobs
Income	$14.0 million
Operation	40 jobs
Income	$3.0 million
Estimated Induced Employment	
Construction	196 jobs
Income	$13.0 million

Operation	37 jobs
Income	$2.0 million

Notes:

1 - At present, there is no property tax assessed on solar components (mirrors, solar boiler, heat exchangers) improvements by law (Section 73 of the California Taxation and Revenue Code). Components included under the exemption include storage devices, power conditioning equipment, transfer equipment, and parts. The first operational year and subsequently thereafter would generate an estimated $200,000 in annual property taxes.

Source: Solar Millennium, 2009a.

C.8.14 RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comments were received both verbally and in writing on the contents of the SA/DEIS from agencies, organizations and members of the public. Written public comments on the **Socioeconomics and Environmental Justice** section of the SA/DEIS were limited to the US Environmental Protection Agency on July 7, 2010 and are summarized below based on the types of issues raised in the comments.

Comment: Describe the reasonably foreseeable development and population growth as a result of the proposed project.

Response: As discussed within this **Socioeconomics and Environmental Justice** section, an analysis is provided for both the proposed PSPP and all project alternatives discussing the impacts of potential worker relocations and population growth at both the local (city of Blythe) and regional (Riverside and San Bernardino Counties) study area levels, as well as from a cumulative standpoint in conjunction with other adjacent proposed solar energy projects.

C.8.15 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

No conditions of certification/mitigation measures are required as all potential socioeconomic impacts associated with the proposed PSPP and alternatives would be less than significant.

C.8.16 CONCLUSIONS

No significant adverse socioeconomics impacts would occur as result of the construction or operation of the proposed PSPP project. Staff believes the PSPP would not cause a significant adverse direct, indirect, or cumulative impact on population, housing, or public services. In addition, because there would be no adverse project-related socioeconomic impacts, minority and low-income populations would not be disproportionately impacted. The proposed PSPP would benefit the local and regional study areas in terms of an increase in local expenditures and payrolls during construction and operation of the facility, as well as a benefit to public finance and local economies through taxation. These activities would have a positive effect on the local and regional economy.

C.8.17 REFERENCES

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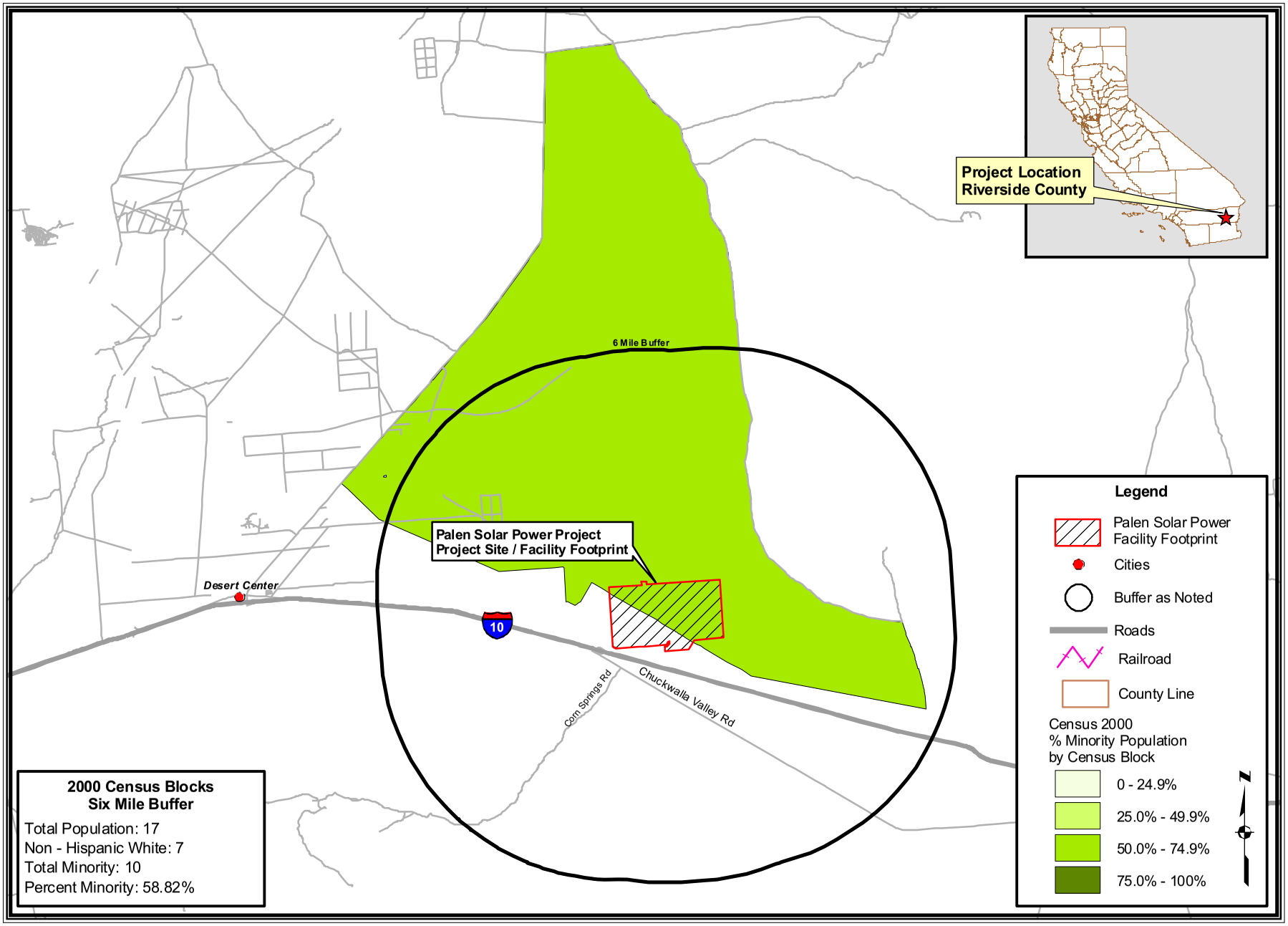
SOCIOECONOMICS - FIGURE 1

Palen Solar Power Project - Census 2000 Minority Population by Census Block - Six Mile Buffer



SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission Statewide Power Plant Maps 2009 - Census 2000 PL 94-171 Data - Matrix PL2

C.9 SOIL AND WATER RESOURCES

The Soil & Water Resources Section will be included in the Revised Staff Assessment, Part 2.

C.10 - TRAFFIC AND TRANSPORTATION

Testimony of Andrea Koch and James Jewell

C.10.1 SUMMARY OF CONCLUSIONS

With implementation of the recommended conditions of certification, the Palen Solar Power Project (PSPP) would be consistent with the County of Riverside General Plan Circulation Element. The project would also be consistent with all other applicable laws, ordinances, regulations, and standards (LORS) related to traffic and transportation.

In addition, with implementation of the recommended conditions of certification, the PSPP would not have a significant adverse impact on the local and regional roadway network. With mitigation, during the construction and operation phases, local roadway and highway demand resulting from the daily movement of workers and materials would not increase beyond significance thresholds established by the County of Riverside for local roads and the State of California for state highways.[1]

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

C.10.2 INTRODUCTION

In the Traffic and Transportation analysis, Energy Commission staff focuses on (1) whether construction and operation of the Palen Solar Power Project (PSPP) would result in traffic and transportation impacts under the California Environmental Quality Act (CEQA); and (2) whether the project would comply with applicable laws, ordinances, regulations, and standards (LORS). The analysis includes discussion of potential impacts to surrounding transportation systems and roadways resulting from construction and operation of the PSPP. Energy Commission staff proposes mitigation measures (conditions of certification) where necessary.

C.10.2.1 PROJECT DESCRIPTION

The Palen Solar Power Project is designed to use solar parabolic trough technology to generate electricity. The PSPP would consist of two nearly identical and independent units, 250 MW each, resulting in a nominal output of 500 MW when fully operational.

If approved, the units would be constructed in phases, with construction scheduled to begin in late 2010 and end in the fourth quarter of 2013. Commercial operation of Unit #1 is scheduled to begin in mid-2013, with commercial operation of Unit #2 following by the end of 2013.

The proposed PSPP site is located in eastern Riverside County about 10 miles east of the unincorporated community of Desert Center, 3 miles east of the southeastern end of Joshua Tree National Park, and about 0.5 mile north of U.S. Interstate-10. The site is

[1] The federal government (NEPA) has not established any standards for congestion, as this is a matter of local preference.

located on approximately 40 acres of private property and 5,160 acres of federal land managed by the Bureau of Land Management (BLM). See **Traffic and Transportation Figures 1 and 2** for views of the regional and local transportation network in the project vicinity.

Site access would be from an extension of Corn Springs Road at the I-10 interchange. The Corn Springs Road extension would be about 1,350 feet long and would run east from just north of the I-10 Corn Springs Road entrance/exit ramps to the project site entrance.

C.10.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Significance criteria for project impacts to the surrounding traffic and transportation systems are based on the following:

1. California Environmental Quality Act (CEQA) Guidelines
2. CEQA Environmental Checklist
3. Performance standards and thresholds established by interested agencies

The National Environmental Policy Act (NEPA) does not provide any standards specific to transportation.

A project may have a significant impact on traffic and transportation systems if it would:

1. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit
2. Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways
3. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks
4. Substantially increase hazards due to a design feature or incompatible uses
5. Result in inadequate emergency access
6. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities

Level of Service

When evaluating project-related impacts on the local transportation system, Energy Commission staff bases its analysis on level of service (LOS) determinations. LOS is a generally accepted measure used by traffic engineers, planners, and decision-makers

to describe and quantify the traffic congestion level on a particular roadway or intersection in terms of speed, travel time, and delay.

The *Highway Capacity Manual 2000,* published by the Transportation Research Board Committee on Highway Capacity and Quality of Service*,* includes six levels of service for roadways and intersections. These levels of service range from LOS A, the best and smoothest operating conditions, to LOS F, the worst, most congested operating conditions.

Riverside County uses LOS criteria to assess the performance and capacity of its street and highway system. In Riverside County's General Plan Circulation Element, Policy C 2.1 provides a target of LOS C or better for all conventional State highways (including I-10) and County-maintained roads. Therefore, the proposed PSPP project would create a significant impact if it caused highways, roadways, or intersections currently operating at LOS C or better to degrade to LOS D or worse.

C.10.4 PROPOSED PROJECT

C.10.4.1 SETTING AND EXISTING CONDITIONS

The proposed project site is located in Riverside County, California along Interstate 10, approximately 10 miles east of the small community of Desert Center and halfway between the cities of Indio and Blythe. The applicant has filed an application with BLM for a right-of-way (ROW) grant of approximately 5,200 acres.

Site access would be from an extension of Corn Springs Road at the I-10 interchange. Corn Springs Road currently runs north-south across I-10 and terminates just north of the I-10 overpass. From this dead-end, Corn Springs Road would be extended about 1,350 feet to the north to connect with a new access road running east into the project site.

Local Highways and Roads

The following describes the roadways in the vicinity of the PSPP site:

U.S. Interstate 10

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

Corn Springs Road

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

Chuckwalla Valley Road

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

Public Transportation

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

Rail and Bus Service

The nearest passenger rail service is an Amtrak station in Palm Springs to the west. With regard to freight rail, on January 13, 2010, the Surface Transportation Board ruled that the Arizona & California Railroad Company could abandon service in Riverside County. Therefore, no rail service exists in the area.

The nearest national bus service stations are the Indio and Blythe Greyhound stations. Local bus service near the project site is limited to the Red Route of the Desert Roadrunner bus service for Blythe, which provides service to the Ironwood/Chuckwalla Valley State Prison approximately 21 miles east of the project, and the Sunline Transit Agency, which provides bus service in the vicinity of Indio.

Bicycle and Pedestrian Facilities

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

Airports

The Federal Aviation Administration (FAA) has notification requirements for airports located within a 20,000-foot (approximately 3.8-mile) horizontal radius of the PSPP site. There are no airports within this radius.

C.10.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The direct and indirect impacts of the proposed PSPP on the traffic and transportation system are discussed in this section. The assessment of transportation-related impacts is based on an analysis which compares the pre-PSPP conditions to the post-PSPP conditions.

Study Intersection / Road Segment Locations

The following locations on the surrounding roadway network were reviewed:

- I-10: West of the Project Site
- I-10: East of the Project Site
- Corn Springs Road
- I-10 Westbound Ramps / Corn Springs Road Westbound Off-Ramp
- I-10 Eastbound Ramps / Corn Springs Road Eastbound Off-Ramp

Direct / Indirect Impacts and Mitigation

The PSPP's direct and indirect impacts on the study intersections and road segments listed above were evaluated using the significance criteria established by the CEQA Guidelines, the CEQA Environmental Checklist, and performance standards and thresholds established by interested agencies.

The PSPP's impacts were evaluated for two separate future year scenarios: peak construction year (2012) and first year of full operation (2014). Traffic during the de-commissioning period would likely be similar to traffic volumes experienced during construction, depending on the duration and extent of decommissioning, including dismantling of facilities and/or site remediation.

Construction Period Impacts and Mitigation

Construction Workforce and Truck Traffic

Over the course of the 39-month construction period, the average workforce is estimated to be about 566 workers a day. Assuming the worst-case scenario of each worker commuting in his or her own vehicle, approximately 1,132 trips per day would be generated.

Peak construction is expected to occur during Month 17 (Year 2012) of the 39-month construction period. The average workforce during peak construction is estimated to be about 1,141 workers a day. Again assuming the worst-case scenario of each worker commuting alone, approximately 2,282 daily one-way worker commute trips would occur during the peak construction period. Most of these trips would occur during the peak morning and afternoon travel times.

Workers for the project would commute from the surrounding areas. Workers from regional areas would find temporary housing in Blythe or Indio or both. Workers from Palm Springs, the Los Angeles basin, and the Indio area would travel east on I-10 to the

project site, while workers from Blythe and the Arizona communities of Quartzsite, Ehrenberg, and Cibola would follow I-10 west to the project site.

Construction of the PSPP would require that oversized equipment, such as the steam turbine generator and main transformers, be transported to the site via multi-axle trucks. Construction of the proposed project is forecasted to generate an average of approximately 20 to 30 daily one-way truck trips, with a peak of approximately 40 daily one-way truck trips. Oversized or overweight trucks with unlicensed drivers could be hazardous to the general public and/or damage roadways. Condition of Certification **TRANS-1** requires that the project owner comply with limits on vehicle sizes and weights and driver licensing regulations. Improper transportation of hazardous materials could also prove a danger to the general public; therefore, Condition of Certification **TRANS-2** requires the owner to secure permits and licenses for the transport of hazardous materials. Finally, even properly sized and licensed trucks could damage roadways. For this reason, Condition of Certification **TRANS-3** requires that the owner restore all roads damaged by construction activities.

Based on the previous information, total average construction traffic (including both worker and multi-axle truck trips) would be approximately 1152-1162 daily one-way trips. Total peak construction traffic would be approximately 2,322 daily one-way trips.

Peak construction would cause a noticeable increase in traffic on I-10. However, with Condition of Certification **TRANS-4**, all study roadways and intersections would operate at LOS C or above during project construction. In fact, most study roadways and intersections would operate at LOS A. Condition of Certification **TRANS-4** requires the project owner to prepare a traffic control plan to reduce work trips through means such as staggered work shifts, off-peak work schedules, and an incentive program for carpooling.

With implementation of **TRANS-4**, the I-10 Westbound Ramps/Corn Springs Road intersection would operate at LOS B during the peak construction morning peak hour. Without **TRANS-4**, this intersection would have operated at LOS E. For more information on traffic during the PSPP's construction period, see **Traffic and Transportation Table 1,** which compares peak hour traffic volume and LOS on all study roadways during the Year 2012 without the PSPP and the Year 2012 with the PSPP (during peak construction).

Traffic and Transportation Table 2 compares peak hour delay and LOS on all study intersections during the Year 2012 without the PSPP and the Year 2012 with the PSPP (during peak construction). For the Year 2012 with the PSPP, the table shows unmitigated traffic conditions, or the conditions these intersections would experience without the traffic control plan required by Condition of Certification **TRANS-4**. For this reason, the table shows the I-10 Westbound Ramps/Corn Springs Road intersection operating at LOS E during this time. According to the applicant, if morning peak hour vehicle volumes were reduced by half, this intersection would operate at LOS B. Condition of Certification **TRANS-4** would require traffic control methods to ensure that vehicle volume would be sufficiently reduced to allow all study roadways and intersections to operate at LOS C or above.

Traffic and Transportation Table 1
Peak Hour Volumes and LOS on Study Roadways During Peak Construction

Roadway Segment	Construction Year (2012) Volume without PSPP	LOS	Construction Year (2012) Volume With PSPP	LOS
I-10: West of the project site	3,145	A	3,716	A
I-10: East of the project site	3,145	A	3,717	A
Corn Springs Road	Negligible	A	1,141	B

Notes:
Volume is peak hour volume
Caltrans Year 2007 traffic volumes were expanded to Year 2012 using the same rate of expansion (3.74%/year) seen during 2004-2007.

Traffic and Transportation Table 2
Peak Hour Delay and LOS on Study Intersections During Peak Construction

Study Intersection	Construction Year (2012) Conditions without PSPP				Construction Year (2012) Conditions with PSPP			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
I-10 Westbound Ramps/Corn Springs Road	Negligible	A	Negligible	A	38.1	E	5	A
I-10 Eastbound Ramps/Corn Springs Road	Negligible	A	Negligible	A	23.0	C	5	A

Notes:
Caltrans Year 2007 traffic volumes were expanded to Year 2012 using the same rate of expansion (3.74%/year) seen during 2004-2007.

Linears

Construction of a transmission line extending from the project site to a new Southern California Edison (SCE) substation west of the PSPP site would require a maximum of approximately 30 workers over a several month period. Construction of the transmission line poles would require the use and installation of heavy equipment and associated systems and structures. Heavy equipment that would be used throughout the construction period includes cranes, cement mixers and drilling equipment. Transmission line construction workers and delivery vehicles will be dispersed along the transmission line route.

There are currently two proposed locations for the SCE substation, so the exact length (7.5 or 15 miles) and route of the transmission line would vary depending on the substation's final location. Regardless of the substation location, the transmission line would exit the northwest corner of the PSPP and travel west and south through BLM lands, crossing I-10 and traveling south into the substation. Construction of the transmission line would not cause significant impacts to traffic volumes and LOS; transmission line construction is not expected to occur at the same time as peak construction employment, and the number of workers would be low. However, construction of the transmission line within the right-of-way of I-10 could potentially cause traffic delays and damage to roadways. To mitigate these impacts, Energy

Commission staff has proposed: Condition of Certification **TRANS-3** to require that the owner restore all roads damaged by construction activities; **TRANS-4** to require the owner to provide access to adjacent properties during construction of linears; and **TRANS-5** to require the owner to obtain encroachment permits from Caltrans and comply with their limitations on encroachment.

A temporary power line would also be needed during construction. Southern California Edison would provide construction power through one of two possible sources: a feed from the existing distribution line that feeds the microwave tower located southwest of the Corn Springs Road interchange or a new transmission line routed down the project transmission line right-of-way from Desert Center Rice Road. If the first option is selected, the line would be extended under I-10 and routed into the project site along the site access road. Construction of the temporary power line within the right-of-way of I-10 could potentially cause traffic delays and damage to roadways. To mitigate these impacts, staff has included **TRANS-3** for road restoration, **TRANS-4** to require access to adjacent properties during construction of linears, and **TRANS-5** to require encroachment permits from Caltrans. (These Conditions of Certification are also described in the preceding paragraph.)

Operation Impacts and Mitigation

Operation of the PSPP would require a labor force of about 134 employees to staff the facility 24 hours a day, 7 days a week. This translates to approximately 268 daily one-way trips, assuming that workers travel in their own individual vehicles. Because employees would arrive and depart at different times throughout the day, they would generate less than 100 daily peak hour trips, even if every employee commutes alone. Energy Commission staff assumes that housing locations for operations employees would be similar to housing locations for PSPP construction employees; therefore, operations workers would access the site using routes similar to those of the construction workers.

Operation of the PSPP would also generate minor truck traffic during activities such as supply delivery and off-site waste shipments. Project operation is anticipated to generate up to 6 truck trips per day, which would not affect the LOS on study roadways and intersections.

During project operation, all study roadway segments and intersections would continue to operate at LOS A, the same LOS experienced currently at these locations prior to development of the PSPP. Because these roadways and intersections would experience LOS higher than LOS C, traffic impacts from PSPP operation would be less than significant. Therefore, no mitigation for operation-related impacts is required.

For more information, see **Traffic and Transportation Table 3**, Peak Hour Volumes and LOS on Study Roadways During Project Operation, and **Traffic and Transportation Table 4**, Peak Hour Delay and LOS on Study Intersections During Project Operation.

Traffic and Transportation Table 3
Peak Hour Volumes and LOS on Study Roadways During Project Operation

Roadway Segment or Intersection	Standard Operations Year (2014) Volume with PSPP	LOS
I-10: West of the project site	3,245	A
I-10: East of the project site	3,245	A
Corn Springs Road	125	A
Notes: Caltrans Year 2007 traffic volumes were expanded to Year 2014 using the same rate of expansion (3.74%/year) seen during 2004-2007.		

Traffic and Transportation Table 4
Peak Hour Delay and LOS on Study Intersections During Project Operation

Study Intersection	Standard Operations Year (2014) Volume with PSPP			
	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
I-10 Westbound Ramps/Corn Springs Road	8.7	A	8.4	A
I-10 Eastbound Ramps/Corn Springs Road	9.2	A	9.4	A
Notes: Caltrans Year 2007 traffic volumes were expanded to Year 2014 using the same rate of expansion (3.74%/year) seen during 2004-2007.				

Emergency Services Vehicle Access

The environmental review of emergency services vehicle access considers the adequacy of off-site emergency vehicles' access to the site. It is Energy Commission staff's opinion that regional access to the site is adequate given that an emergency vehicle could access the project property directly from I-10 at Corn Springs Road.

On-site circulation of emergency vehicles would be subject to site plan review by the Riverside County Fire Department per Conditions of Certification **WS-1** and **WS-2** in the **WORKER SAFETY AND FIRE PROTECTION** section of this document. Condition of Certification **WS-6** would require the project owner to provide a secondary access to the site for emergency purposes, subject to review by the Riverside County Fire Department. These Conditions would ensure adequate local emergency vehicle access.

Water, Rail, and Air Traffic

The proposed PSPP is not adjacent to a navigable body of water and therefore would not alter water-related transportation. The proposed project also would not alter rail transportation. No rail tracks exist on or near the project site.

There are no airports within 20,000 feet of the PSPP, so no FAA notification is required.

Glare Impact on Motorists

PSPP's Unit 2 is closest to I-10 at approximately 343 meters (1,125 feet) from the highway. At this distance, there is no potential for retinal damage from the solar facility;

unless an individual is near the focal point of the collector, there is no risk of permanent eye damage (retinal burn) for an exposure of 0.15 seconds, which is the typical blink reflex time.

Based on consultation with Clifford Ho of Sandia Laboratories, an expert on glint and glare from solar arrays, staff concludes that the major glint or glare issue for motorists would be from specular reflections from the mirror in the mornings and evenings during the summer when the sun rises and sets to the north. During these times, there may be glare visible to motorists driving west (during the morning) or east (during the evening) from the south end of the trough collectors or when the collectors are moving off-axis (e.g., to or from stow position). To mitigate these glare impacts, staff has proposed Condition of Certification **TRANS-6** to move the collectors to or from stow only after sunset or before sunrise. Condition of Certification **VIS-4**, Reduction of Glint and Glare, in the **VISUAL RESOURCES** section of this document, would require slatted fencing between the project and I-10. This fencing would help mitigate any glare caused by spillage from the south end of the collectors.

Transport of Hazardous Material

Both the construction and operation of the proposed PSPP would involve the transport of hazardous materials to the site. Heat transfer fluid would be delivered during construction, and two weekly deliveries of liquefied petroleum gas (LPG) would be made during project operation. The transport vehicles are required to follow federal and state regulations governing proper containment vessels and vehicles, including appropriate identification of the nature of the contents.

In addition to the governing federal and state regulations, Condition of Certification **TRANS-2** requires that the project owner secure permits and/or licenses from the California Highway Patrol and Caltrans for the transport of hazardous materials. Also, Condition of Certification **HAZ-3** in the **HAZARDOUS MATERIALS MANAGEMENT** section of this document would require the applicant to develop and implement a Safety Management Plan for the delivery of hazardous materials.

Parking Capacity

Construction period parking demands would be accommodated by a temporary on-site parking area of approximately 10 acres, which would be relocated around the project site as needed during different stages of construction. This parking area would accommodate all construction workforce vehicles if workers commuted individually. Additional area might be required for the unloading of equipment, materials, and supplies.

During operations, employees would park on-site in a 47,500 square-foot parking area, which would accommodate about 135 parking spaces, assuming 350 square feet per vehicle is needed. This would adequately accommodate the 134-employee workforce, especially given the fact that employee shifts would be staggered. Because the PSPP supplies an adequate amount of on-site parking, the project would not result in any parking spill-over to sensitive areas and would not create any adverse impacts.

Laws, Ordinances, Regulations, and Standards (LORS)

In addition to the LOS significance criteria discussed in Section C.10.3, Energy Commission staff uses Laws, Ordinances, and Standards (LORS) as significance criteria to determine if the proposed PSPP would have a significant adverse impact on the environment. The federal, state, and local regulations that are applicable to the proposed PSPP are listed below in **Traffic and Transportation Table 5**:

Traffic and Transportation Table 5
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	
Title 49 Code of Federal Regulations (CFR) Subtitle B, Parts 171-173, 177-178, 350-359, 397.9 and Appendices A-G	Addresses safety considerations for the transport of goods, materials, and substances. Governs the transportation of hazardous materials including types of materials and marking of the transportation vehicles.
State	
California Vehicle Code (VC) Sections 353; 2500-2505; 31303-31309; 32000-32053; 32100-32109; 31600-31620; California Health and Safety Code Section 25160 et seq.	Regulates the highway transport of hazardous materials.
VC Sections 13369; 15275 and 15278	Addresses the licensing of drivers and the classification of licenses required for the operation of particular types of vehicles; also requires certificates permitting operation of vehicles transporting hazardous materials.
VC Sections 35100 et seq.; 35250 et seq.; 35400 et seq.	Specifies limits for vehicle width, height, and length.
VC Section 35780	Requires permits for any load exceeding Caltrans weight, length, or width standards on public roadways.
California Streets and Highways Code Section 117, 660-672	Requires permits for any load exceeding Caltrans weight, length, or width standards on County roads.
California Streets and Highways Code Sections 117, 660-670, 1450, 1460 et seq., and 1480 et seq.	Regulates permits from Caltrans for any roadway encroachment from facilities that require construction, maintenance, or repairs on or across State highways and County roads.
Local	
Riverside County General Plan Circulation Element	Specifies long-term planning goals and procedures for transportation infrastructure system quality.
Riverside County General Plan Circulation Element	Specifies LOS standards used to assess the performance of a street or highway system and the capacity of a roadway.
Riverside County Municipal Code Title 10, Chapter 10.08, Sections 10.08.010-10.08.180	Specifies limits and permit requirements for oversize loads.
Riverside County Municipal Code Title 12, Chapter 12.08, Sections 12.08.010-12.08.100	Specifies requirements for encroachment permits.

Conflict with Policies, Plans, or Programs

The PSPP would not conflict with any formal transportation-related Federal, State, or local policies, plans, or programs. For more information about the project's compliance with the above LORs, see Section C.10.12 of this report.

C.10.4.3 CEQA LEVEL OF SIGNIFICANCE

With implementation of the recommended conditions of certification, the impacts of the PSPP project on traffic and transportation would be less than significant.

C.10.5 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

This alternative is analyzed because:

1. It would retain the 500 MW generation capacity defined for the proposed project, and the engineering is defined by Palen Solar I, LLC as feasible;
2. It reduces impacts to the primary and secondary desert washes that cross the proposed site; and
3. It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

C.10.5.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the Palen ROW application area, but the alternative would remain entirely within BLM managed lands.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. The setting for Unit 2 would be similar to that for the proposed project.

C.10.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Reconfigured Alternative would have the same impact on the traffic and transportation system as the proposed project. This is due to the fact that the Reconfigured Alternative uses the same project access and requires the same number of construction workers, operators, and truck deliveries.

C.10.5.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, impacts would be less than significant with mitigations and would not cause unacceptable LOS.

C.10.6 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as

illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.10.6.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

C.10.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Reconfigured Alternative #2 would have the same impact on the traffic and transportation system as the proposed project. This is due to the fact that Reconfigured Alternative #2 uses the same project access and requires a similar number of construction workers, operators, and truck deliveries. The mitigation that would be proposed for Reconfigured Alternative #2 would be the same as that proposed for the proposed project (staff recommended conditions **TRANS-1** to **TRANS-5**).

C.10.6.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, impacts would be less than significant with mitigations and would not cause unacceptable LOS.

C.10.7 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.10.7.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern half of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located primarily on public land managed by BLM; however, as with the proposed project, it includes a 40 acre private parcel on which the applicant has a purchase option.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

C.10.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Reconfigured Alternative #3 would have the same impact on the traffic and transportation system as the proposed project. This is due to the fact that the Reconfigured Alternative #3 uses the same project access and requires a similar number of construction workers, operators, and truck deliveries. The mitigation that would be proposed for Reconfigured Alternative #3 would be the same as that proposed for the proposed project (staff recommended conditions **TRANS-1** to **TRANS-5**).

C.10.7.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, impacts would be less than significant with mitigations and would not cause unacceptable LOS.

C.10.8 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be about 25% smaller, occupying about 2,080 acres of land (as compared with 2,740 acres required for the proposed project). The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**. It would have a net generating capacity of approximately 375 MW (as compared with the proposed project's 500 MW).

This alternative is analyzed for several reasons:

1. It would eliminate about 25% of the proposed project area so all impacts would be reduced;
2. It would reduce impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley Aeolian sand corridor, and the Mojave Fringe-Toed Lizard by

prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields;

3. It would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 2; and
4. It would reduce impacts to primary and secondary desert washes crossing the proposed site.

C.10.8.1 SETTING AND EXISTING CONDITIONS

The Reduced Acreage Alternative would incorporate the following changes from the Reconfiguration Alternative:

- It would modify the boundaries of Unit 1 as follows:
- Preclude the use of the northeastern quarter of the westernmost solar field
- Reduce and revise the easternmost solar field to avoid the dune habitat
- Result in approximately 803 acres or approximately 55% of the Reconfigured Alternative Unit 1 (1,467 acres).
- It would modify the boundaries of Unit 2 as follows:
- Eliminate the southernmost segment of Unit 2 (170 acres within Desert Tortoise Critical Habitat)
- Eliminate the northernmost area of Unit 2 (260 acres of dune sands and MFTL habitat)
- Add 215 acres to the western end of the second and third rows of solar trough loops to make up for some of the reductions described above.

As such, the setting for the Reduced Acreage Alternative is the same as for the Reconfigured Alternative with the exception of the changes addressed above.

C.10.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Reduced Acreage Alternative would have a similar impact on the traffic and transportation system as the proposed project. This is due to the fact that the Reduced Acreage Alternative uses similar project access and numbers of construction workers, operators, and truck deliveries. However, the Reduced Acreage Alternative may have fewer impacts than the proposed project because it is smaller in size.

C.10.8.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, impacts would be less than significant with mitigations and would not cause unacceptable LOS.

C.10.9 NO PROJECT/NO ACTION ALTERNATIVE

The No Project Alternative under CEQA or the No Action Alternative under NEPA defines the scenario that would exist if the proposed Palen Project were not

constructed. The CEQA Guidelines state that "the purpose of describing and analyzing a 'no project' alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. 14 §15126.6(i)). The No Project analysis in this RSA considers existing conditions and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (Cal. Code Regs, tit. 14 §15126.6(e)(2)). Under NEPA, the No Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives.

No Project/No Action Alternative #1:

No Action on the PSPP application and on the California Desert Conservation Area (CDCA) land use plan amendment

Under this alternative, the proposed PSPP would not be approved by the Energy Commission and BLM, and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the transportation and traffic related impacts of the PSPP would not occur at the proposed site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

No Project/No Action Alternative #2:

No Action on the PSPP application, and amendment of the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed PSPP would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, the increases in traffic from the construction and operation of the solar project would likely be similar to the transportation and traffic related impacts from the proposed project. As such, this No Project/No Action Alternative could result in impacts to traffic and transportation similar to the impacts under the proposed project.

No Project/No Action Alternative #3:

No Action on the PSPP application, and amendment of the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed PSPP would not be approved by the Energy Commission and BLM, and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no increase in traffic. As a result, this No Project/No Action Alternative would not result in the impacts to traffic and transportation under the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.10.10 PROJECT-RELATED FUTURE ACTIONS – TRANSPORTATION AND TRAFFIC

In order to transmit the power generated at the PSPP to the electricity grid, a new substation is required. Southern California Edison Company (SCE) would construct and operate the substation, which would allow the electricity to be carried by the Devers-Palo Verde No. 1 (DPV1) 500 kV transmission line.

The SCE Red Bluff Substation is a reasonably foreseeable project if the PSPP is approved and constructed as proposed. Therefore, this section examines the potential impacts of the construction and operation of the proposed substation. This substation would allow interconnection of the PSPP and other renewable projects in the Desert Center area.

The SCE Red Bluff Substation project would be fully evaluated in a future EIS prepared by the BLM. Because detailed design information is not yet available for the Red Bluff Substation, the impact analysis presented here is based on available information. The purpose of this analysis is to inform the Energy Commission and BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the PSPP.

The project components and construction activities associated with this substation are described in Section B.3 of this Revised Staff Assessment/EIS, and a map of its location is presented as **Figure B.3-1**. This analysis examines the construction and operational impacts of a 230/500 kV substation that would be located on approximately 90 acres, south of Interstate 10 and southeast of Desert Center. Substation components would include 230 kV and 500 kV lines, 230/ 500 kV transformer banks, associated

switchracks, and a microwave tower. The substation would be located in an existing CDCA utility corridor, north of and adjacent to the existing DPV1 500 kV transmission line.

C.10.10.1 Environmental Setting

The existing SCE 500 kV transmission lines are situated within an established ROW and CDCA utility corridor. The transportation network that would be affected by the SCE Red Bluff Substation would be located in eastern Riverside County. The environmental setting for Traffic and Transportation is presented in Section C.10.4 and presents detailed information regarding the local and regional roadways that would be used to reach the construction areas, including the traffic conditions of I-10.

At this location, I-10 consists of two lanes in each direction. All access ways to and from the Red Bluff Substation project, including I-10 East, I-10 West, I-10 Eastbound and Westbound ramps, Corn Springs Road, and Rice Road, are forecast to operate at LOS A-B in morning and afternoon hours through year 2014 (Solar Millennium 2009a).

C.10.10.2 Environmental Impacts

Construction of the Red Bluff Substation would result in a temporary increase in traffic volumes on the regional and local roadways that provide access to the substation site, i.e., Rice Road (SR 177), Corn Springs Road, and I-10. Construction worker commute trips and equipment/material deliveries would generate truck and automobile/light-duty vehicle traffic during construction. Based on the construction of other 230/500 kV substations, daily workforce would be expected to be comprised of 10 to 20 workers on a typical day of construction activity, and fewer than 10 truck trips per day would be generated. The workers' vehicles, trucks, and equipment would be parked/stored at the project site.

Large vehicles delivering substation equipment and materials and oversized vehicles used in the construction process may affect traffic flow on one or more of the roadways, resulting in a safety hazard. These potential impacts could be avoided through mitigation, which is discussed below. In addition, there is potential for damage to existing roads by vehicles and equipment (overhead line trucks, crew trucks, concrete trucks, etc.) that would be entering and leaving roads within the project area.

Potential permits and impact fees that may be applicable to the project construction and transport of equipment or materials would be similar to those required for the PSPP project and included in Table 5.13-3 of the PSPP AFC. These permits include County and State encroachment permits and County and State oversize load permits.

Normal operation of the Red Bluff Substation is expected to have negligible impacts on the ground transportation system (roadways), as it is unlikely that there would be any full time operators of the substation that would commute to the site, and inspection and maintenance activities would generate only a minor volume of vehicular traffic.

C.10.10.3 Mitigation

All access and spur road improvements and construction, whether on or off of the ROW,

would be built in compliance with applicable permits and approvals, and any damage to existing roads as a result of construction would be repaired after construction completion.

The intersection of a new access road with an existing public road would be constructed in accordance with the requirements of the agency having authority over the existing public road. Any activity that would need to occur outside of the existing utility corridor would require landowner notification and permission for access.

C.10.10.4 Conclusion

Because the majority of the construction activities would take place in undeveloped areas on BLM land, it is projected that the construction and operational activities related to the substation would have minimal effect on the traffic level of service for the roadways in the project vicinity. Movement of heavy machinery on local roads would occur intermittently, but infrequently, over the construction period. Based on the temporary nature of the construction activities and the minor staffing and equipment expected to be required, coupled with implementation of mitigation measures similar to conditions of certification concerning peak hour traffic, potential impacts of SCE's substation to traffic and transportation would be less than significant.

C.10.11 CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact when 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 (1) past projects; (2) other current projects; and (3) probable future projects (California Code Regulation, Title 14, section 15130). According to the National Environmental Policy Act (NEPA), cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR §1508.7).

The potential exists for substantial future development throughout the entire Southern California Desert Region as well as on the Interstate 10 (I-10) corridor in Eastern Riverside County. See **Traffic and Transportation Figure 3**, 1-10 Corridor Existing and Proposed Projects.

In this document, Energy Commission staff has limited the traffic and transportation analysis to the I-10 corridor of Eastern Riverside County, the location of the proposed Blythe, Palen, and Genesis solar projects. These three projects were included in one cumulative analysis for the following reasons:

1. Access to all three projects is from I-10.
2. All three projects exist in close proximity to one another, and their construction schedules would overlap. Construction schedules are projected to overlap from the fourth quarter of 2010 through 2015. Consequently, the impacts of all three projects must be considered cumulatively. For the locations of these projects, see **Traffic and Transportation Figure 3**, I-10 Corridor Existing and Proposed Projects.

The analysis in this section first defines the geographic area over which cumulative impacts to traffic and transportation could occur. It then provides information about the

potential for cumulative impacts to occur as a result of implementation of the Blythe, Palen, and Genesis solar projects along the I-10 corridor in addition to other applicable local and regional projects listed in **Traffic and Transportation Figure 3**, I-10 Corridor Existing and Proposed Projects.

Geographic Extent

The Blythe Solar Power Project (BSPP), Palen Solar Power Project (PSPP), and Genesis Solar Energy Project (GSEP) are located within 45 miles of the city of Blythe on the I-10 corridor. The Bureau of Land Management has developed coordinated management plans for various areas in the California desert owned by the federal government. These three proposed solar facilities are included in the Northern and Eastern Colorado Desert Coordinated Management Plan. See **Traffic and Transportation Figure 3** for facility locations.

In the I-10 corridor in the vicinity of these projects, approximately 20 additional energy-related projects, including solar, wind, pumped storage, and transmission lines, are being considered or expected to be considered for development by the Federal Energy Regulatory Commission (FERC); Bureau of Land Management (BLM); and the California Energy Commission. In addition, local residential and commercial development is proposed during this period. As a result, traffic could be cumulatively affected.

Cumulative impacts could occur to both the local roadway network and the regional roadway network. Cumulative impacts to the local roadway network would occur if the impacts of the three projects combined with impacts of projects already located or to be located within the same general vicinity as the Blythe, Palen, and Genesis solar projects. Local impacts include damage to local roadways; traffic delays due to road closures; and increased congestion from project-related traffic.

Cumulative impacts could also affect the regional roadway network if impacts were to occur on I-10, the primary access to the project sites. I-10 is the southernmost east-west, coast-to-coast highway in the United States, stretching from Santa Monica, California to Interstate 95 in Jacksonville, Florida. In between its terminuses, I-10 passes through Phoenix and Tucson in Arizona, New Mexico, Texas, Louisiana, Mississippi, and Alabama. In California, the Santa Monica Freeway comprises the westernmost segment of I-10. I-10 merges with the Santa Monica Freeway and the San Bernardino Freeway and goes on eastward to Riverside County. Traffic on I-10 is significantly reduced as it runs through the Coachella/Indio area and into the Mojave Desert, the area in which the three proposed solar projects are located.

In this analysis, staff concentrates on the cumulative impacts on traffic and transportation along I-10 for approximately 170 miles beginning near Indio, California, and ending approximately 50 miles west of Blythe, California. [2]

The three projects analyzed in this section are expected to employ more than one thousand workers during the construction period. For all projects, the construction

[2] The Mojave Desert covers an area of approximately 25,000 square miles. In California, the Mojave Desert is bordered on the south by I-10 and on the west by US 395. The desert's northern border is US 50, its southern border, I-15 in Nevada.

workforce is expected to come from the surrounding local and regional areas, including a limited number of workers from the Los Angeles basin and the Phoenix, Arizona area. However, the majority of construction workers for the three projects are expected to live or reside temporarily in Indio, Blythe, or Parker, Arizona, which is about 35 miles north of I-10. All workers would arrive at the project sites via I-10 east and I-10 west.

The regional cumulative impacts analysis of these three projects does not include currently proposed solar and wind projects located more than 45 miles east and west and 30 miles north of the Blythe Solar Power Project. This is because of the vast area over which these projects are spread, making impacts from projects further away unlikely. Furthermore, cumulative impacts from beyond this area would be precluded by: differing construction schedules; combined CEQA/NEPA requirements for mitigating significant cumulative traffic impacts; and the California Energy Commission's conditions of certification for mitigating cumulative impacts resulting from the Blythe, Palen, and Genesis projects.

Potential Environmental Impacts

Local Impacts during Construction

Construction-related commuter traffic and equipment deliveries for the Blythe, Palen, and Genesis solar projects are as follows:

Blythe

Construction of the BSPP would be completed over an approximately 69-month period, beginning in fourth quarter 2010 and ending in fourth quarter 2016. The construction work force would average approximately 600 workers, peaking in size during Month 16 at approximately 1,000 workers per day. Construction of the transmission line would require fewer than 25 workers during peak periods and would not coincide with the peak of plant site construction employment.

Assuming the worst-case scenario, where all workers commute in their own individual vehicles, the BSPP would generate an average of 1,200 daily one-way trips (one trip during the morning peak hour and one trip during the evening peak hour for each worker). During Month 16, the estimated construction peak, the BSPP would generate about 2,000 one-way worker commute trips per day.

In addition, construction is forecast to generate an average of approximately 15-20 one-way truck trips per day, with a peak of approximately 50-75 truck trips per day; the peak truck travel would be during plant site foundation construction and would not coincide with the peak construction work force commute times during Month 16.

Palen

Construction of the PSPP would occur over approximately 39 months, beginning in the fourth quarter of 2010 and ending in the fourth quarter of 2013. The number of construction workers would peak during Month 17 at approximately 1,141 per day and average about 566 workers over the course of construction. In addition, a transmission line extending from the project site to a new Southern California Edison substation west of the project site would require approximately 30 workers. The construction schedule of

the power line is not expected to coincide with construction of the solar facility. In addition, construction would not encroach onto a public right-of-way or coincide with peak construction employment.

The worst-case scenario for the PSPP, where all workers during the peak construction period commute in their individual vehicles, yields a peak trip generation of approximately 1,141 inbound trips during the morning peak period and another 1,141 outbound trips during the evening peak hour. This results in a total of 2,282 daily one-way trips during the peak construction period of Month 17. During the average, non-peak construction month, the PSPP would generate 566 worker trips during the morning peak period and another 566 trips during the evening peak period. This would result in an average of about 1,132 daily one-way trips during the average construction month. Construction is also expected to generate an average of approximately 20 to 30 one-way truck trips per day with a peak of approximately 40 truck trips per day.

Without traffic mitigation, particularly for the I-10 Corn Springs Road westbound and eastbound ramps, construction of the PSPP could result in significant cumulative impacts to traffic. To mitigate these impacts, staff has proposed Condition of Certification **TRANS-4** to require a traffic control plan with provisions for staggered work shifts, off-peak work schedules, and/or restrictions on vehicle movement to minimize traffic impacts to I-10 throughout the project's construction period.

Staff has also proposed Condition of Certification **TRANS-3** to ensure the repair of any damage to roadways caused by equipment and supply delivery during construction.

Genesis

The 37-month construction period for the GSEP is expected to begin in 2012 and end in 2015. The project construction work force would peak during Month 23 at approximately 1,093 workers per day, with an average of approximately 652 workers per day over the course of construction. Construction of the access road, transmission line, and gas line would not coincide with the plant's peak construction period. At most, construction of the access road is expected to require a crew of less than 25 workers; construction of the transmission line, less than 35 workers; and construction of the gas line, less than 50 workers.

The worst-case scenario for the GSEP, where all workers during the peak construction period commute in their own individual vehicles, yields a peak trip generation of approximately 1,093 inbound trips during the morning peak period and another 1,093 outbound trips during the evening peak hour. This results in a total of 2,282 daily one-way trips during the peak construction period of Month 23. During the average, non-peak construction month, the GSEP would generate 652 worker trips during the morning peak period and another 652 trips during the evening peak period. This would result in an average of about 1,304 daily one-way trips during the average construction month.

Construction is also expected to generate an average of approximately 15 to 20 one-way truck trips per day with a peak of approximately 50 to 75 truck trips per day. Peak truck travel would occur during plant site foundation construction and would not coincide with the peak on-site worker commute time.

All Three Projects: Blythe, Palen, and Genesis

I-10 would provide construction vehicle access for all three projects. In addition, each project would generate trips during construction and operation over its own particular local intersections, as follows:

1. I-10 at Corn Springs Road (West of the Palen site)
2. 1-10 at Wiley's Well Road (East and West of the Genesis site)
3. 1-10 at Mesa Drive (East of the Blythe site)

Because Blythe, Palen, and Genesis would have overlapping construction schedules, traffic impacts could potentially be exacerbated locally along I-10 and at the above intersections. Consequently, staff has proposed Condition of Certification **TRANS-4** to require a traffic plan for Palen. The Blythe and Genesis projects also include this Condition of Certification. The traffic plans would include measures such as staggered work shifts, off-peak work schedules, travel restrictions, and incentives for carpooling to mitigate potential cumulative impacts on I-10 caused by these projects during their construction periods.

Staff has also proposed Condition of Certification **TRANS-3** to ensure repair of any roadway damage caused by construction equipment and supply delivery. The Blythe and Genesis projects also include this condition.

Regional Impacts during Construction

Several projects included in **Traffic and Transportation Figure 3** have the potential to result in increased congestion regionally on I-10. These projects include Chuckwalla Valley State Prison; Eagle Mountain Pumping Plant; commercial projects approved by the City of Blythe; Blythe Energy Project II; Blythe Airport Solar I Project; Mule Mountain Solar Project; Big Maria Vista Solar Project; Blythe PV Project; Desert Quartzite; Desert Sunlight; Mojave Solar Park/Desert Lily Project; McCoy Soleil; Red Bluff Substation; and the Chuckwalla Valley Raceway.

Although I-10 currently operates at LOS A, the high volume of traffic resulting from the overlapping construction of the Palen, Blythe, and Genesis projects could result in I-10 operating at a lower LOS. In addition, the LOS on I-10 could further degrade with the identified additional projects listed previously and shown in **Traffic and Transportation Figure 3**. Back-ups at intersections and off-ramps could create bottlenecks and further reduce LOS on I-10. As a result of all these projects, cumulative impacts are significant.

The PSPP, BSPP, and GSEP would mitigate their contributions to this cumulative impact through the measures outlined in Condition of Certification **TRANS-4**. However, even with implementation of Condition of Certification **TRANS-4**, there may be cumulative impacts to I-10 resulting from the other projects in the area, and LOS may decrease. However, the conditions proposed here would ensure that Palen's contribution to this impact would not be cumulatively considerable.

Local and Regional Impacts during Operation and Decommissioning

Operation

The operation of the three solar projects analyzed in this section would not significantly contribute to long-term operational cumulative impacts related to traffic and transportation. During operation years, I-10 is expected to carry low traffic volumes and operate at LOS A. The small number of operations workers for each project would not increase the traffic volumes enough to reduce operations to below LOS A.

Decommissioning

The decommissioning of the Blythe, Palen, and Genesis solar projects, which is unlikely during the next 40 years, is not expected to result in adverse cumulative traffic and transportation impacts. These three projects are not likely to be decommissioned at the same time, and even if they were, any cumulative impacts could easily be mitigated by staggering construction employees' work schedules to ensure acceptable LOS levels. Also, construction of other solar projects is not likely to occur during the decommissioning of the Blythe, Palen, and Genesis solar projects.

Cumulative Impacts Conclusion

In this analysis, staff considered the cumulative impacts of the Blythe, Palen, and Genesis solar projects on the I-10 traffic corridor in eastern Riverside County (stretching 170 miles from Indio, California to 50 miles west of Blythe, California). Without mitigation, the traffic and transportation impacts of these three solar projects would have the potential to result in cumulatively considerable impacts to I-10 as well as to local streets, highways, and intersections in the vicinity of the project sites. These cumulative impacts could also combine with the impacts of past, present, or reasonably foreseeable projects in the area to result in even greater cumulative impacts. Consequently, Energy Commission staff has recommended Conditions of Certification **TRANS-3** and **TRANS-4** to reduce the cumulative impacts of these three projects to less than significant.

C.10.12 COMPLIANCE WITH LORS

The proposed PSPP is intended to comply with all federal, state, and local LORS. Development and operation of the PSPP as planned would not conflict with the LORS as described in this section. **Traffic and Transportation Table 6** summarizes the PSPP's conformance with all applicable LORS.

Traffic and Transportation Table 6
PSPP Compliance with Adopted Traffic and Transportation LORS

Applicable LORS	Description
Federal	
Title 49 Code of Federal Regulations (CFR) Subtitle B, Parts 171-173, 177-178, 350-359, 397.9 and Appendices A-G	Addresses safety considerations for the transport of goods, materials, and substances. Governs the transportation of hazardous materials including types of materials and marking of the transportation vehicles. Consistent: PSPP construction and operation would involve transport of hazardous materials, such as liquid fuels (gasoline and diesel) and propane. Enforcement is conducted by state and local law

Applicable LORS	Description
	enforcement agencies, and through state agency licensing and ministerial permitting (e.g., California Department of Motor Vehicles licensing, Caltrans permits), and/or local agency permitting (e.g., County of Riverside). The applicant will adhere to all required regulations. This adherence is made part of the licensing process as Condition of Certification **TRANS-2**.
State	
California Vehicle Code (VC) Sections 353; 2500-2505; 31303-31309; 32000-32053; 32100-32109; 31600-31620; California Health and Safety Code Section 25160 et seq.	Regulates the highway transport of hazardous materials. Consistent: The PSPP will comply with these regulations. Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting and/or local agency permitting. Adherence is made part of the licensing process as Condition of Certification **TRANS-2**.
VC Sections 13369; 15275 and 15278	Addresses the licensing of drivers and the classification of licenses required for the operation of particular types of vehicles; also requires certificates permitting operation of vehicles transporting hazardous materials. Consistent: The applicant will comply with these regulations. Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting and/or local agency permitting. Adherence is made part of the licensing process as Conditions of Certification **TRANS-1** and **TRANS-2**.
VC Sections 35100 et seq.; Section 35250 et seq.; and Section 35400 et seq.	Specifies limits for vehicle width, height, and length. Consistent: The PSPP will comply with these regulations. Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting and/or local agency permitting. Adherence is made part of the licensing process as Condition of Certification **TRANS-1**.
VC Section 35780	Requires permits for any load exceeding Caltrans weight, length, or width standards for public roadways. Consistent: The PSPP will comply with these regulations. Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting and/or local agency permitting. Adherence is made part of the licensing process as Condition of Certification **TRANS-1**.
California Streets and Highways Code Section 117, 660-672	Requires permits for any load exceeding Caltrans weight, length, or width standards on County roads. Consistent: The PSPP will comply with these regulations. Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting and/or local agency permitting. Adherence is made part of the licensing process as Condition of Certification **TRANS-1**.
California Streets and Highways Code Sections 117, 660-670, 1450, 1460 et seq., and 1480 et seq.	Regulates permits from Caltrans for any roadway encroachment for facilities that require construction, maintenance, or repairs on or across State highways and County roads. Consistent: The PSPP will comply with these regulations. Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting and/or local agency permitting. Adherence is made part of the licensing process as Condition of Certification **TRANS-3** and **TRANS-5**.

Applicable LORS	Description
Local	
Riverside County General Plan Circulation Element	Specifies long-term planning goals and procedures for transportation infrastructure system quality. Consistent: The PSPP is consistent with the goals and policies of the Circulation Element. The PSPP mitigates project-related impacts through Conditions of Certification, and it incorporates transportation demand management through measures such as staggered work hours, off-peak work schedules, travel restrictions, and incentives for carpooling. See **TRANS-3** and **TRANS-4**.
Riverside County General Plan Circulation Element	Specifies LOS standards to assess the performance of a street or highway system and the capacity of a roadway. Consistent: With Condition of Certification **TRANS-4**, the PSPP would meet these LOS standards. All nearby roadways and intersections would operate at LOS C or better.
Riverside County Municipal Code Title 10, Chapter 10.08, Sections 10.08.010-10.08.180	Specifies limits and permit requirements for oversize loads. Consistent: The PSPP will comply with these regulations. Riverside County will provide enforcement and any necessary permitting. Adherence is made part of the licensing process as Condition of Certification **TRANS-1**.
Riverside County Municipal Code Title 12, Chapter 12.08, Sections 12.08.010-12.08.100	Specifies permit requirements for encroachment permits. Consistent: The PSPP will comply with these regulations. Riverside County will provide enforcement and any necessary permitting. Adherence is made part of the licensing process as Condition of Certification **TRANS-5**.

C.10.13 NOTEWORTHY PUBLIC BENEFITS

While the development of the proposed project is intended to address the requirements of federal and state mandates to develop renewable energy, it would not yield any noteworthy public benefits related to traffic and transportation.

C.10.14 RESPONSE TO AGENCY AND PUBLIC COMMENTS

The California Department of Transportation (Caltrans) submitted a letter dated April 23, 2010 regarding the Palen project. Caltrans provided preliminary comments, but stated that their agency was still reviewing the SA and might provide further comments. Energy Commission staff never received any further comments. Caltrans' initial comments are listed below, along with Energy Commission staff's explanation of how each comment has been addressed in this RSA:

- Bicycles are allowed on State highways where no alternative route is available, such as on I-10 from Dillon Road, Coachella to Mesa Drive, Blythe.

  Response: Energy Commission staff has revised Section C.10.4.1 of this RSA under the heading "US Interstate 10" to reflect that bicycles are allowed on I-10 in the vicinity of the Palen project.

- The applicant shall be responsible for maintenance of the access road.

Response: Please see the Worker Safety and Fire Protection section of this RSA, specifically Section C.14.12, "Response to Agency and Public Comments".

- If it is determined that the access road to the PSPP will be within the Caltrans right-of-way for I-10 (which extends beyond the Corn Springs Road Interchange), the project owner must prepare plans for work within the Caltrans right-of-way that adhere to Caltrans' most recent design standards and construction practices. When lane closures are required on I-10 during construction, the project owner should consult Section 517 of Caltrans' Encroachment Permits Manual for the proper procedures to manage traffic during construction.

  Issuance of a Caltrans Encroachment Permit will be required prior to any construction within the right-of-way and shall be in compliance with all current design standards, applicable policies, and construction practices. Please refer to the Encroachment Permits Manual, the Right of Way Manual, and the Project Development Procedure Manual.

  Response: Conditions of Certification **TRANS-4** and **TRANS-5** address this comment. These conditions require: consultation with Caltrans during preparation of a Traffic Control Plan (TCP) for construction; and compliance with Caltrans' regulations regarding encroachment.

- If crossing I-10 and if feasible, new utility installations and adjustment or relocation of existing utilities should cross on a line normal to, but not less than 60 degrees, from the freeway longitudinal alignment and preferably under the freeway. The utility should be located so that it may be serviced, maintained, and operated from outside the right-of-way, except for special cases.

  Response: Condition of Certification **TRANS-5**, which requires compliance with Caltrans' regulations regarding encroachment, addresses this comment.

- Caltrans has the discretionary authority to issue special permits for the movement of vehicles and loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the California Vehicle Code. Requests for such special permits require a Transportation Permit.

  Response: Conditions of Certification **TRANS-1** and **TRANS-4** address this comment. These conditions require the project owner to: obtain all the necessary transportation permits from Caltrans; comply with Caltrans regulations regarding vehicle sizes and weights and driver licensing; and consult with Caltrans during preparation of a Traffic Control Plan (TCP) for construction.

C.10.15 PROPOSED CONDITIONS OF CERTIFICATION

It should be noted that the Bureau of Land Management (BLM) has reviewed and agreed to the following conditions of certification for the PSPP.

TRANS-1 The project owner shall comply with limitations imposed by Caltrans District 8 and other relevant jurisdictions, including the County of Riverside, on vehicle sizes and weights and driver licensing. In addition, the project owner or its

contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

Verification: In the Monthly Compliance Reports (MCRs), the project owner shall report permits received during that reporting period. In addition, the project owner shall retain copies of permits and supporting documentation on-site for Compliance Project Manager (CPM) inspection if requested.

TRANS-2 The project owner shall ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for the transport of hazardous materials.

Verification: In the MCRs, the project owner shall report permits and/or licenses for hazardous substance transportation received during that reporting period. In addition, the project owner shall retain copies of permits, licenses, and supporting documentation on-site for CPM inspection if requested.

TRANS-3 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 CPM. Repair and restoration of access roads may be required at any time during the construction phase of the project to assure safe ingress and egress.

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 segments and/or intersections and shall provide the CPM and the affected local jurisdictions and Caltrans (if applicable) with a copy of these images. The project owner shall rebuild, repair and maintain all public roads, easements, and rights-of-way in a usable condition throughout the construction phase of the project.

At least 30 days prior to the start of site mobilization, the project owner shall consult with the County of Riverside 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 Riverside 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 the CPM, the County of Riverside, 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 to the CPM a letter signed by the County of Riverside and Caltrans District 8 stating their satisfaction with the repairs.

TRANS-4 Prior to the start of construction of the PSPP, the project owner shall prepare and implement a Traffic Control Plan (TCP) for the PSPP's construction and operations 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 Riverside and the California Department of Transportation (Caltrans) District 8 office in the preparation and implementation of the Traffic Control Plan (TCP). The project owner shall submit the proposed TCP to the County of Riverside and the Caltrans District 8 office in sufficient time for review and comment, and to the Energy Commission Compliance Project Manager (CPM) for review and approval prior to the proposed start of construction and implementation of the plan.

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 Riverside and the Caltrans District 8 office and any changes to the TCP to the CPM prior to the proposed start of construction.

The Traffic Control Plan (TCP) shall include:

- A work schedule and end-of-shift departure plan designed to ensure that stacking does not occur at intersections necessary to enter and exit the project sites. The project owner shall consider using one or more of the following measures designed to prevent stacking: staggered work shifts, off-peak work schedules, and/or restricting travel to and departures from each project site to 10 or fewer vehicles every three minutes during peak travel hours on I-10.
- Provisions for an incentive program, such as employer-sponsored commuter checks, to encourage construction workers to carpool and/or use van or bus service.
- Limitation of truck deliveries at the project site to only off-peak hours.
- A heavy-haul plan addressing the transport and delivery of heavy and oversized loads requiring permits from the California Department of Transportation (Caltrans) or other state or federal agencies.
- Timing of heavy equipment and building material delivery to the sites
- Parking for workforce and construction vehicles.
- Emergency vehicle access to the project site.
- Provisions for redirection of construction traffic with a flag person as necessary to ensure traffic safety and minimize interruptions to non-construction related traffic flow.
- Placement of signage, lighting, and traffic control devices at the project construction site and laydown areas.
- Placement of signage along northbound Corn Springs Road and at the entrance of each of the I-10 westbound and eastbound off-ramps at Corn Springs Road notifying drivers of construction traffic throughout the duration of the construction period.

- Placement of signage to redirect traffic from Corn Springs Road during construction activities related to roadway realignments and pipeline installation in and across the Corn Springs Road right-of-way
- Temporary closing of travel lanes, if necessary.
- Access to adjacent residential and commercial property during the construction of all linears

Verification: At least 60 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 TCP to the County of Riverside and the Caltrans District 8 office for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the County of Riverside 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 Riverside and the Caltrans District 8 office, along with any changes to the proposed Traffic Control Plan, to the CPM for review and approval.

TRANS-5 The project owner or contractor shall comply with Caltrans' and other relevant jurisdictions' limitations for encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans and any other relevant jurisdictions.

Verification: In the MCRs, the project owner shall report permits received during that reporting period. In addition, for at least six months after the start of commercial operation, the project owner shall retain copies of permits and supporting documentation on-site for CPM inspection if requested.

TRANS-6 The project owner shall adhere to the following procedures and specifications:

1. The "morning stow to tracking transitions" shall occur before sunrise.
2. The "night stow" shall occur after sunset.
3. The applicant shall: (1) develop and implement an emergency glare response plan to immediately take out of service and redirect a malfunctioning or glare-producing mirror to a safe orientation before putting it back in service; (2) monitor the site for all hours of operation to identify, document, and immediately take out of service malfunctioning or glare-producing mirrors; and (3) repair and redirect mirrors responsible for intrusive light conditions before putting mirrors back in service.

   The applicant shall develop a procedure to report malfunctioning or glare-producing mirrors to the CPM, Caltrans District 8 Office, and the County of Riverside, and include a toll-free number for the public to report the problem, as well as a process for written notification to be given to the project owner and agencies responsible for the safe operation of roads as appropriate. The procedure shall be designed to quickly and effectively

deal with any glare or other visual disturbance caused by a malfunctioning or glare-producing mirror.

Verification: Before the start of operation, the project owner shall provide to the CPM for review and approval:

1. A copy of the plan to monitor; immediately take out of service; and realign any malfunctioning or glare-producing mirror before putting it back into service.

2. A copy of procedures designed by the applicant to report malfunctioning or glare-producing mirrors to the CPM; Caltrans District 8 Office; and the County of Riverside, as appropriate. The procedures shall include a toll-free number to report the problem as well as a process for written notification to be given to the project owner and agencies responsible for the safe operation of roads. The procedures shall allow the project owner to quickly and effectively deal with any glare or other visual disturbance caused by a malfunctioning or glare-producing mirror.

The project owner shall provide this information to the CPM in a monthly report in which the number of complaints; date, time, and location of complaint; and procedures taken to remedy complaint, including the length of time taken to remedy, will be included. A copy of these reports shall be kept by the project owner for at least five years

C.10.16 CONCLUSIONS

1. The PSPP project as proposed and with conditions of certification would comply with all applicable LORS related to traffic and transportation. It would result in less than significant impacts to the traffic and transportation system. This also holds true for the Reconfigured Alternative, Reconfigured Alternative #2, Reconfigured Alternative #3, and the Reduced Acreage Alternative.
2. Because of the PSPP's distance from the nearest airport, no impact on the Desert Center Airport, Blythe Airport, or Palm Springs International Airport would occur, and the project would not impact aviation safety.
3. Because of the PSPP's distance from the nearest rail and bus service, the project would have no impact on these forms of transportation.
4. With the implementation of proposed conditions of certification, the PSPP project would cause no significant direct or cumulative traffic and transportation impacts, and therefore, no environmental justice issues.
5. Energy Commission staff is proposing Condition of Certification **TRANS-1** which requires the owner to comply with limits on vehicle sizes and weights and driver licensing regulations.
6. Energy Commission staff is proposing Condition of Certification **TRANS-2**, which requires the owner to secure permits and licenses for the transport of hazardous materials.
7. Energy Commission staff is proposing Condition of Certification **TRANS-3**, which requires the owner to restore all roads damaged by construction activities.

8. Energy Commission staff is proposing Condition of Certification **TRANS-4**, which requires the owner to develop and implement a Traffic Control Plan (TCP). The TCP would include a plan for reducing peak construction workforce vehicle trips.
9. Energy Commission staff is proposing Condition of Certification **TRANS-5**, which requires the owner to comply with limits on encroachment into public-right-of-way and to obtain all of the necessary project permits.
10. Energy Commission staff is proposing Condition of Certification **TRANS-6**, which requires the owner to move the collectors to or from stow only after sunset or before sunrise and to develop and implement an emergency glare response plan.

C.10.17 REFERENCES

California Code. *Health and Safety Code*. 2010.

California Code. *Streets and Highways Code*. 2010.

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Caltrans (California Department of Transportation). *2007 Traffic Volumes*. 2010.

Code of Federal Regulations. *Title 14 Aeronautics and Space, Federal Aviation Administration*. 2010.

Code of Federal Regulations. *Title 47 Federal Communications Commission (FCC)*. 2010.

Code of Federal Regulations. *Title 49 Environment, Subtitle B – Other Regulations Relating to Transportation.* 2008.

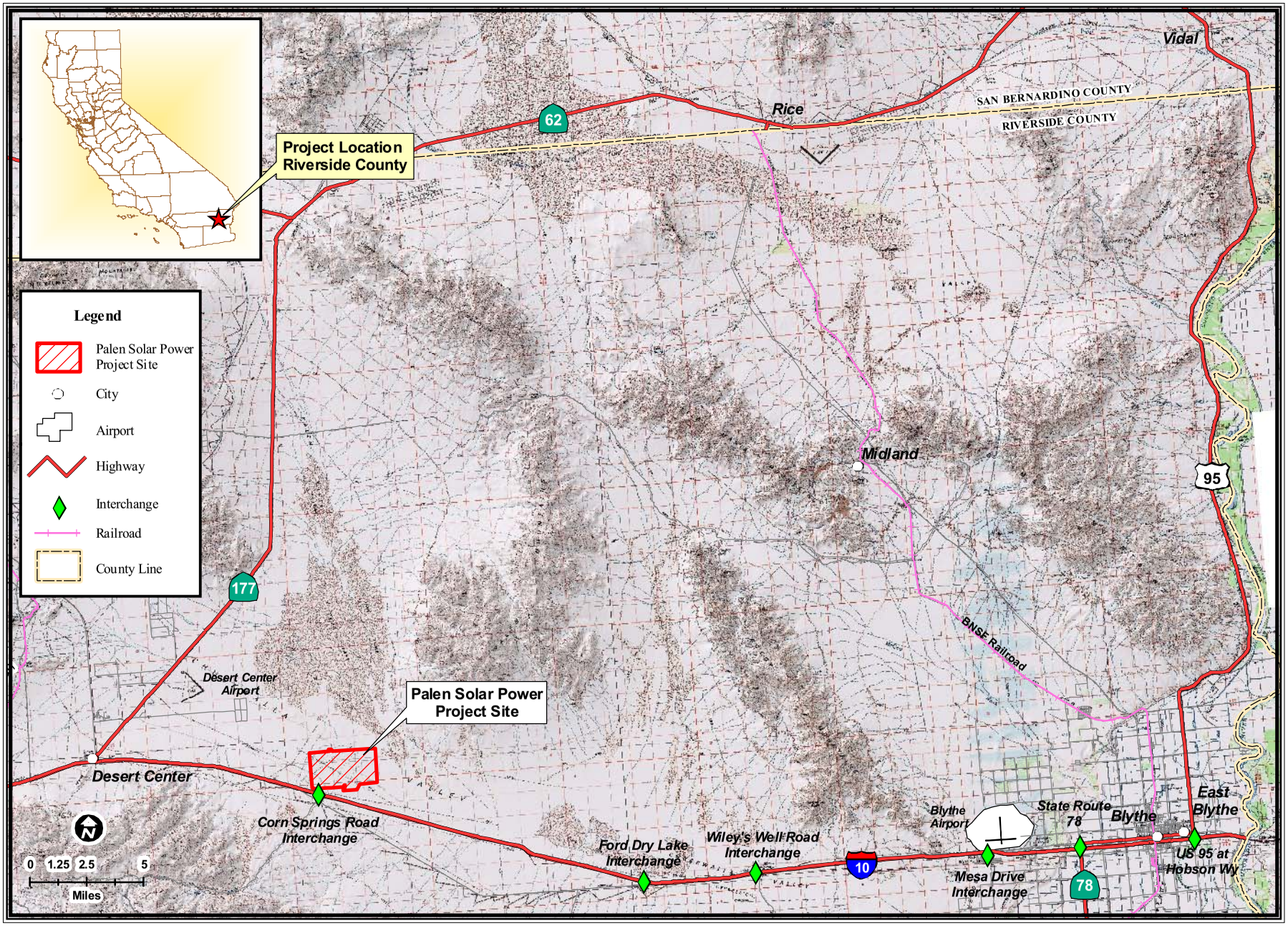
County of Riverside. *Circulation Element and Palo Verde Area Plan of the General Plan*. 2003, 2008.

Rail America. *Arizona and California Railroad (ARZC)*. http://www.railamerica.com/RailServices/ARZC.aspx. Accessed January 2010.

Union Pacific. *Union Pacific in California*. http://www.uprr.com/aboutup/usguide/attachments/state_factsheets/ca.pdf. Accessed January 2010.

TRAFFIC AND TRANSPORTATION - FIGURE 1

Palen Solar Power Project - Regional Transportation Network

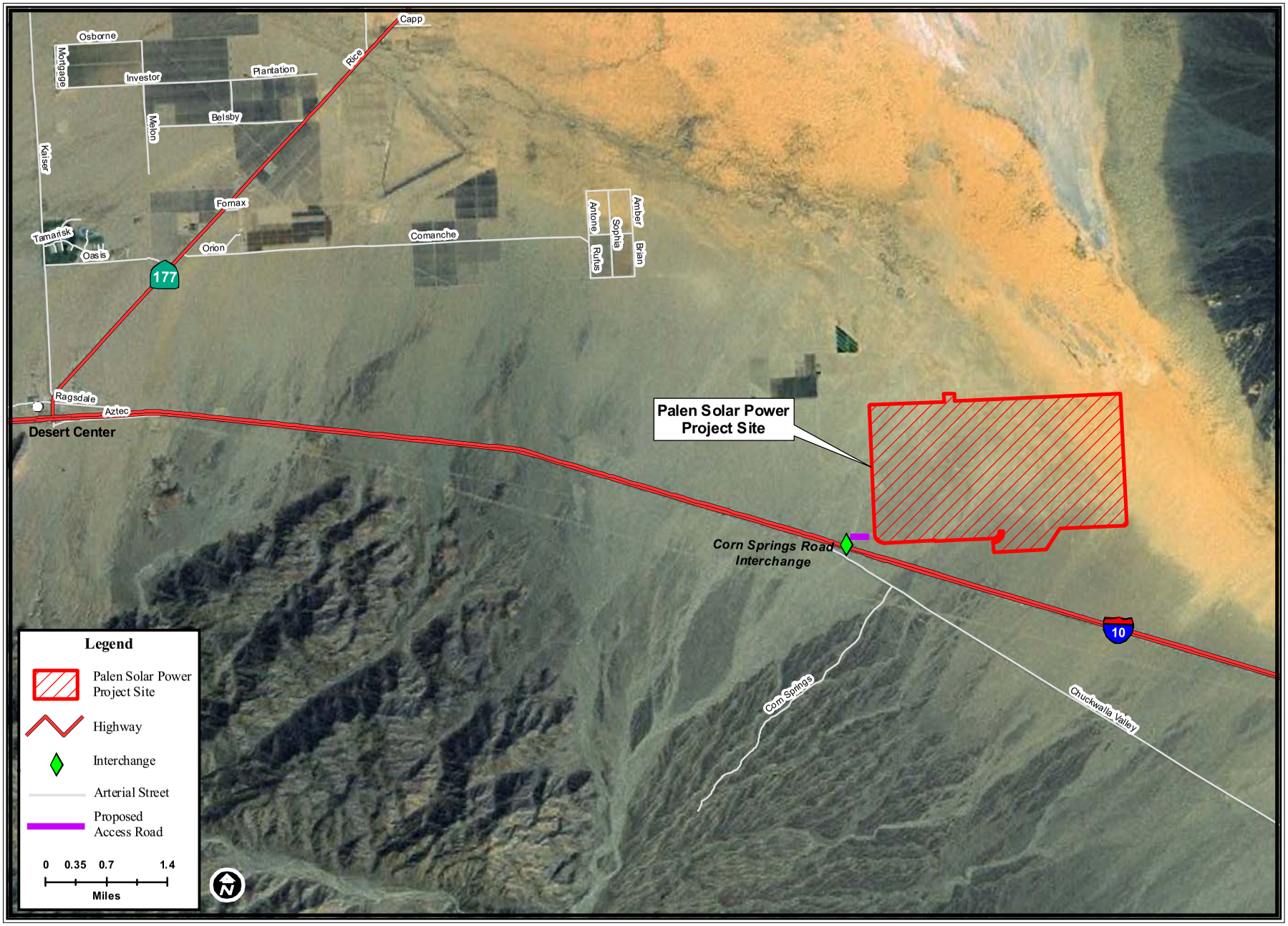


CALIFORNIA ENERGY COMMISSION - SITING,TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission Statewide Power Plant Maps 2010 - Tele Atlas

TRAFFIC AND TRANSPORTATION - FIGURE 2

Palen Solar Power Project - Local Transportation Network



TRAFFIC & TRANSPORTATION

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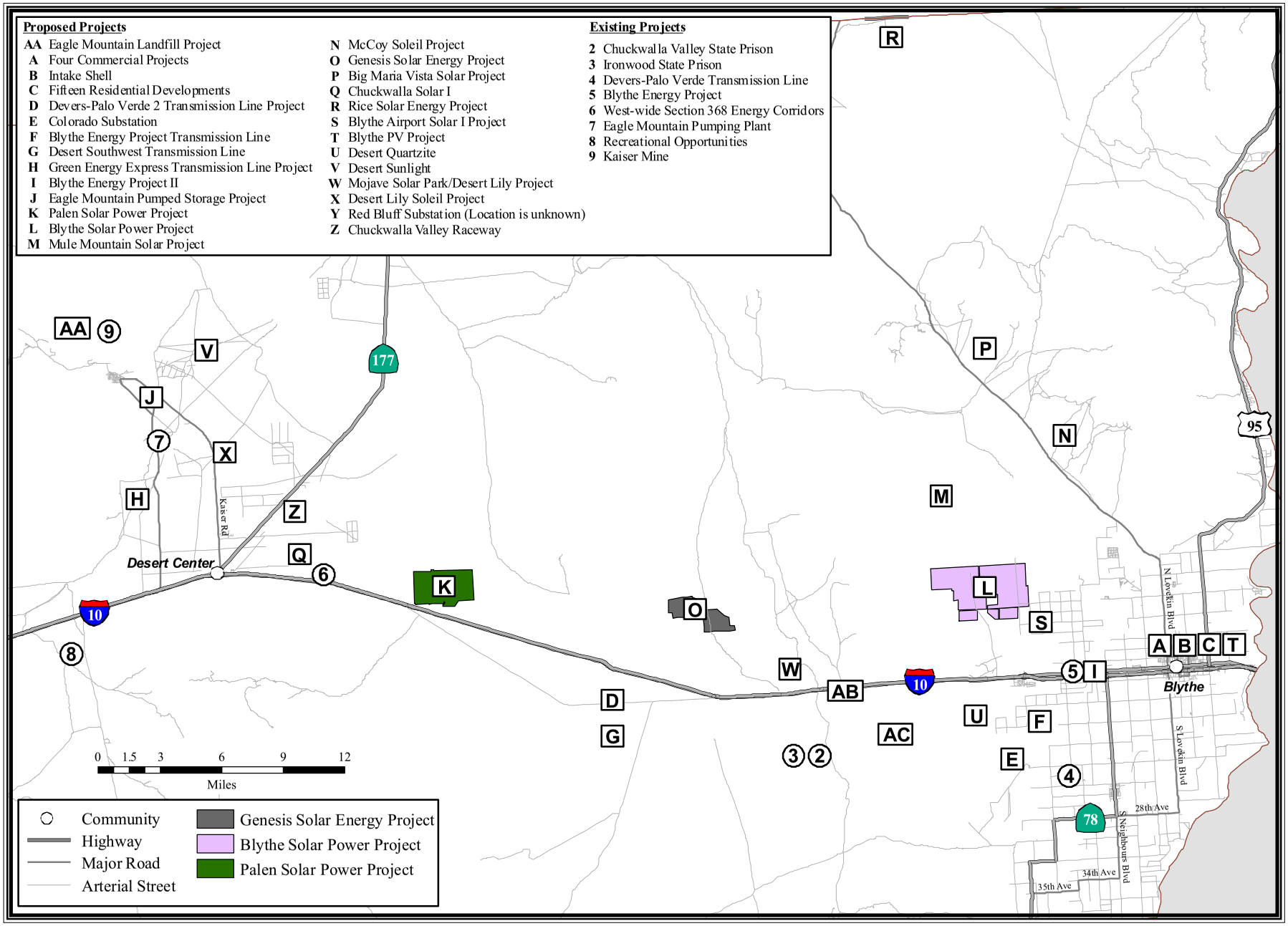
SOURCE: California Energy Commission Statewide Power Plant Maps 2010 - Tele Atlas

TRAFFIC & TRANSPORTATION - FIGURE 3

Palen Solar Power Project - I-10 Corridor Existing and Proposed Projects



TRAFFIC & TRANSPORTATION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission, Bureau of Land Management

C.11 – TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

C.11.1 SUMMARY OF CONCLUSIONS

The applicant, Palen Solar I, LLC,[1] proposes to transmit the power from the proposed Palen Solar Power Project (PSPP) to the Southern California Edison's (SCE's) transmission grid through SCE's proposed Red Bluff Substation at a location near the community of Desert Center to the west. The project's tie-in line would be a single-circuit 230-kV transmission line connecting the project's on-site 230-kV switchyard to the proposed SCE Red Bluff Substation. This proposed substation would be under the jurisdiction of the California Public Utilities Commission (PUC) and the Bureau of Land management (BLM). Therefore, this staff analysis is for the tie-in project line as it stretches from the proposed on-site substation to the proposed SCE substation. Since the proposed tie-in line would be located in the SCE service area, it would be constructed, operated, and maintained according to SCE's guidelines for line safety and field management which conform to applicable laws, ordinances, regulations and standards (LORS). Although the specific location of the proposed SCE substation has not been affirmed by SCE, the available area for the proposed route is undisturbed desert land with no nearby residents, thereby eliminating the potential for residential electric and magnetic field exposures when the line is operating. With the four proposed conditions of certification, any safety and nuisance impacts from routing the proposed tie-in line from the project site to the area around the community of Desert Center would be less than significant.

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

C.11.2 INTRODUCTION

The purpose of this staff assessment is to assess the proposed Palen Solar Power Project's (PSPP's) transmission line's design and operational plan to determine whether its related field and nonfield impacts would constitute a significant environmental hazard in the areas around the proposed route as it runs between the site and the community of Desert Center approximately 10 miles to the west. PSPP would consist of two units (Unit 1 and Unit 2) whose generated power would be transmitted to the Southern California Edison's (SCE's) proposed Red Bluff Substation using an overhead single-circuit 230-kilovolt (kV) line. The SCE substation (whose exact location near the community of Desert Center is yet to be affirmed by SCE) would be built by SCE under the jurisdiction of the California Public Utilities Commission (PUC) and the Bureau of Land Management (BLM). This staff analysis is for the proposed PSPP tie-in line and related on-site switchyard to be built and operated by the applicant. The potential

[1] Chevron Energy Solutions and Solar Millennium have a joint development agreement. Chevron Energy Solutions applied for the Right Of Way for Palen Solar Power Project. To facilitate the permitting of the Palen Solar Power Project (PSPP), the Applicant is requesting that the Energy Commission issue one license to a project-specific company. The company for PSPP is Palen Solar I, LLC a wholly owned subsidiary of Solar Millennium and the single Applicant for PSPP.

impacts of concern are those to be encountered along any specific corridor chosen in the area between the project site and the proposed SCE substation. All related health and safety laws, ordinances, regulations, and standards (LORS) are currently aimed at minimizing such impacts along the proposed and any given line corridor. Staff's analysis focuses on the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

Section C.11.3 shows the federal, state, and local laws and policies that apply to the control of the field and nonfield impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

C.11.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The potential magnitude of the line impacts of concern in this staff analysis depends on compliance with the listed design-related LORS and industry practices. These LORS and practices have been established to maintain impacts below levels of potential significance. Thus, if staff determines that the project would comply with applicable LORS, we would conclude that any transmission line-related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below together with the potential for compliance with the LORS that apply.

C.11.3.1 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Transmission Line Safety and Nuisance (TLSN) Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

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.

Applicable LORS	Description
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 (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	
Riverside County General Plan, Noise Element	Establishes policies and programs to ensure that noise levels are appropriate to land uses.
Riverside County Noise Ordinance	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.
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.

Applicable LORS	Description
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.

C.11.4 PROPOSED PROJECT

C.11.4.1 SETTING AND EXISTING CONDITIONS

As discussed by the applicant, Palen Solar I LLC, the two units of the proposed Palen Power Project (Unit 1 and Unit 2) would occupy a total of 2, 970 acres of mostly federal land currently managed by the Bureau of Land Management (BLM). The site is vacant undeveloped desert approximately 0.5 miles north of Interstate 10, and 10 miles east of the rural community of Desert Center in eastern Riverside County (Solar Millennium 2009a, pp. 2-1 and 5.7-12). As more fully discussed by the applicant, each of the proposed units would have its own solar power but the generated power would be transmitted to the SCE power grid from a central switchyard using a single-circuit overhead, 230-kV line. The point of connection with the SCE grid would be SCE's planned Red Bluff Substation approximately 10 miles to the west. The precise location of the planned substation has not yet been affirmed but the applicant has identified a candidate corridor area within which the line would be routed between the site and the planned substation (Solar Millennium 2009a, pp. 5.7-10, 5.8-8, and 5.14-6). Since this planned SCE substation would be under the jurisdiction of the PUC, it would be designed, built, and operated according to SDG&E guidelines in keeping with existing LORS.

The proposed project site is in an uninhabited open desert land with no existing structures other than SCE's 161-kV Eagle Mountain-Blythe transmission that traverses the southwestern portion. The area of the candidate routes for the proposed PSPP is largely uninhabited desert land with only two residences within 2 miles of it. The closest is approximately 1,000 feet from the site boundary (Solar Millennium 2009, pp. 5.7-12 and 5.8-7). The general absence of residences in the immediate project area and the vicinity of the area available for routing the project's tie-in line, means that there would not be the type of residential field exposure that has been of health concern in recent years over power line operation.

C.11.4.2 PROJECT DESCRIPTION

The proposed PSPP 230-kV tie-in line would consist of the following individual segments:

- A new, single-circuit 230-kV overhead transmission line extending the 10 miles from the on-site project switchyard to the planned SCE Red Bluff Substation; and

- The project's on-site 230-kV switchyard from which the conductors would extend to the planned Red Bluff Substation.

The conductors for the proposed PSPP line would be aluminum steel-reinforced cables supported on steel pole structures placed approximately 1,100 feet apart and with a maximum height of 120 feet as typical of similar SCE lines. The width of the right-of-way would be approximately 120 feet (Solar Millennium 2009a, p. 2-27). The applicant (Solar Millennium 2009a, p. 5.14-11) provided the details of the proposed support structures as related to line safety, maintainability, and field reduction efficiency

C.11.4.3 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Direct Impacts and Mitigation Methods

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace. The requirements listed on **TLSN Table 1** establish the standards for assessing the potential for obstruction hazards within the navigable space and establish the criteria for determining when to notify the FAA about such hazards. As noted by the applicant (Solar Millennium 2009a, p. 5.14-6), these regulations require FAA notification in cases of structures over 200 feet from the ground. Notification is also required if the structure is to be below 200 feet in height but would be located within the restricted airspace in the approaches to public or military airports. For airports with runways longer than 3,200 feet, the restricted space is defined by the FAA as an area extending 20,000 feet from the runway. For airports with runways of 3,200 feet or less, the restricted airspace would be an area that extends 10,000 feet from this runway. For heliports, the restricted space is an area that extends 5,000 feet.

The closest operational airport of concern is Blythe Airport, approximately 30 miles east of the project site and therefore too far away for the proposed line to pose an aviation hazard to utilizing aircraft. Also, the maximum height of 120 feet for the proposed line support structures (Solar Millennium 2009a, p. 2-27, and Figure 5.14-1) would be much less than the 200 feet that triggers the concern over aviation hazard according to FAA requirements. Therefore, staff does not recommend any related condition of certification.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as *corona discharge*, but is referred to as *spark gap electric discharge* when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any

such interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed project line would be built and maintained in keeping with standard SCE practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345 kV and above, and not for 230-kV lines such as the proposed line. The line's proposed low-corona designs are used for all SCE lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Since the proposed line would traverse an uninhabited open space, staff does not expect any corona-related radio-frequency interference or related complaints and does not recommend any related condition of certification.

Audible Noise

The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. As with radio noise, such noise is limited instead through design, construction, or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345 kV as proposed for PSPP. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the low-corona designs are also aimed at minimizing field strengths, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to staff's analysis in the **Noise** section.

Fire Hazards

The fire hazards addressed through the related LORS in **TLSN Table 1** are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

Standard fire prevention and suppression measures for similar SCE lines would be implemented for the proposed project line (Solar Millennium 2009a, p. 5.14-10). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. Condition of Certification **TLSN-3** is recommended to ensure compliance with important aspects of the fire prevention measures.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

The applicant's stated intention to implement the GO-95-related measures against direct contact with the energized line (Solar Millennium 2009a, p. 5.14-10) would serve to minimize the risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** would be adequate to ensure implementation of the necessary mitigation measures.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). For the proposed project line, the project owner will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices (Solar Millennium 2009a, p. 5.14-7). Staff recommends Condition of Certification **TLSN-4** to ensure such grounding for PSPP.

Electric and Magnetic Field Exposure

The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines. Both electric and magnetic fields occur together whenever electricity flows, and exposure to them together is generally referred to as *EMF exposure*. The available evidence as evaluated by the CPUC, other regulatory agencies, and staff has not established that such fields pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff therefore considers it appropriate, in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- There are measures that can be employed for field reduction, but they can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State's Approach to Regulating Field Exposures

In California, the CPUC (which regulates the installation and operation of many high-voltage lines owned and operated by investor-owned utilities) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of 1 meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line

voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors, and, in the case of magnetic fields, amount of current in the line.

Since the CPUC currently requires that most new lines in California be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, their fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed project line according to existing SCE field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

The CPUC has recently revisited the EMF management issue to assess the need for policy changes to reflect the available information on possible health impacts. The findings specified in Decision D.06-1-42 of January 2006, did not point to a need for significant changes to existing field management policies. Since there are no residences in the immediate vicinity of the proposed project line, there would not be the long-term residential EMF exposures mostly responsible for the health concern of recent years. The only project-related EMF exposures of potential significance would be the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the vicinity of the line. These types of exposures are short term and well understood as not significantly related to the health concern.

Industry's and Applicant's Approach to Reducing Field Exposures

The present focus is on the magnetic field because unlike electric fields, it can penetrate the soil, buildings, and other materials to produce the types of human exposures at the root of the health concern of recent years. The industry seeks to reduce exposure, not by setting specific exposure limits, but through design guidelines that minimize exposure in each given case. As one focuses on the strong magnetic fields from the more visible high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields while using some common household appliances than from high-voltage lines (National Institute of Environmental Health Services and the U.S. Department of Energy, 1998). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short term, while the exposures from power lines are lower level, but long term. Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

As with similar SCE lines, specific field strength-reducing measures would be incorporated into the proposed line's design to ensure the field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

The field reduction measures to be applied include the following:

1. increasing the distance between the conductors and the ground to an optimal level;
2. reducing the spacing between the conductors to an optimal level;
3. minimizing the current in the line; and

4. arranging current flow to maximize the cancellation effects from interacting of conductor fields.

Since the possible route of the proposed project line would have no residences in the immediate vicinity of the right-of-way, the long-term residential field exposures at the root of the health concern of recent years would not be a significant concern for either line. The field strengths of most significance in this regard would be as encountered at the edge of the line's 100-foot right-of-way. These field intensities would depend on the effectiveness of the applied field-reducing measures. The applicant (Solar Millennium 2009a, p. 5.14-8 and Figures 5.14-2 and 5.14-3) calculated the maximum electric and magnetic field intensities expected along the proposed route of the project line. Staff has verified the accuracy of the modeling approach used in the applicant's calculations with regard to parameters bearing on field strength dissipation and exposure assessment. The maximum electric field strength was calculated as 0.053 kV/m at the edge of the 150-foot right-of-way and is thus similar to those of SCE lines of the same voltage rating. The maximum magnetic field intensity of approximately 32.5 mG at the edge of this right-of-way is similar to that of SCE lines of the same current-carrying capacity (as required under current CPUC regulations) but is much less than the 200 mG currently specified by the few states with regulatory limits. The requirements in Condition of Certification **TLSN-2** for field strength measurements are intended to validate the applicant's assumed reduction efficiency.

C11.4.4 CLOSURE AND DECOMMISSIONING IMPACTS AND MITIGATION

If the proposed PSPP were to be closed, decommissioned and all related structures are removed as described in the **Project Description** section, the minimal area aviation risk and electric shocks and fire hazards from the physical presence of this tie-in line would be eliminated. Decommissioning and removal would also eliminate the line's field impacts assessed in this analysis in terms of nuisance shocks, radio-frequency impacts, audible noise, and electric and magnetic field exposure. Since the line would be designed and operated according to existing SCE guidelines, these impacts would be as expected for SCE lines of the same voltage and current-carrying capacity and therefore, at levels reflecting compliance with existing health and safety LORS.

C.11.5 RECONFIGURED ALTERNATIVE # 1

The #1 reconfigured alternative would be a 500 MW facility like the proposed project but would be configured to change the boundaries of each of the two units as shown in **Alternatives Figure 1**. This reconfiguration would result in a project in which the use of Unit 1 would avoid the use of the northern third of the proposed site causing the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside the project's proposed boundaries but would remain entirely within BLM managed lands. In this alternative, Unit 2 (the western solar field) would remain in the same approximate location but would be reconfigured into a shape that avoids the secondary washes crossing the site. Unit 1 would still be a 250 MW solar generating facility on approximately 1,490 acres of land as would Unit 2 which would be on 1,450 acres. The reconfigured units would use approximately 180 acres more land than the original proposal.

For this reconfigured alternative, the generated power would be transmitted to the SCE power grid through the proposed SCE Red Bluff Substation and would require a transmission infrastructure similar to that for the proposed version. The routes of the related line would require minor adjustments to accommodate the changed solar field configurations.

C.11.5.1 SETTING AND EXISTING CONDITIONS

The setting for this alternative would be the same uninhabited desert land under the jurisdiction of the BLM. Please see the discussion existing conditions within affected BLM lands under Section C.11.4.1

C.11.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff's analysis focuses on the transmission line required to serve the generation facility, and addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

Since the line for the proposed 500 MW project and the reconfigured 500 MW alternative would be designed and operated according to the applicable SCE guidelines, there would not be any significant differences in the magnitude of the field and nonfield impacts of concern in this analysis. This similarity in impacts would manifest itself with regard to the discussed radio frequency communication, audible noise, hazardous and nuisance shocks, electric and magnetic field levels, fire hazards and aviation safety.

C.11.5.3 CEQA LEVEL OF SIGNIFICANCE

Since staff finds the potential impacts of line operations to be at less than significant levels for the proposed SCE design, staff would expect implementation of the same design for the reconfigured version (as required by current LORS) to also produce impacts that would be at less than significant levels.

C.11.6 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.11.6.1 SETTING AND EXISTING CONDITIONS

The setting for this alternative would be the same uninhabited desert land under the jurisdiction of the BLM. Please see the discussion existing conditions within affected BLM lands under Section C.11.4.1

C.11.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff's analysis focuses on the transmission line required to serve the generation facility, and addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

Since the transmission line for the proposed 500 MW project and the Reconfigured Alternative #2 would be in the same location and would be designed and operated according to the applicable SCE guidelines, there would not be any significant differences in the magnitude of the field and nonfield impacts of concern in this analysis. This similarity in impacts would manifest itself with regard to the discussed radio frequency communication, audible noise, hazardous and nuisance shocks, electric and magnetic field levels, fire hazards and aviation safety.

C.12.6.3 CEQA LEVEL OF SIGNIFICANCE

Since staff finds the potential impacts of line operations to be at less than significant levels for the proposed SCE design, staff would expect implementation of the same design for the reconfigured version (as required by current LORS) to also produce impacts that would be at less than significant levels.

C.11.7 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.11.7.1 SETTING AND EXISTING CONDITIONS

The setting for this alternative would be the same uninhabited desert land under the jurisdiction of the BLM. Please see the discussion existing conditions within affected BLM lands under Section C.11.4.1

C.11.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff's analysis focuses on the transmission line required to serve the generation facility, and addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

Since the line for the proposed 500 MW project and the Reconfigured Alternative #3 would be in the same location and would be designed and operated according to the applicable SCE guidelines, there would not be any significant differences in the magnitude of the field and nonfield impacts of concern in this analysis. This similarity in impacts would manifest itself with regard to the discussed radio frequency communication, audible noise, hazardous and nuisance shocks, electric and magnetic field levels, fire hazards and aviation safety.

C.12.7.3 CEQA LEVEL OF SIGNIFICANCE

Since staff finds the potential impacts of line operations to be at less than significant levels for the proposed SCE design, staff would expect implementation of the same design for the reconfigured version (as required by current LORS) to also produce impacts that would be at less than significant levels.

C.11.8 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be approximately 25% smaller, occupying about 2080 acres of land (as compared with 2,740 acres required for the proposed project). The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**. The Reduce Acreage Alternative would result in an approximately 375 MW project.

This alternative is analyzed for several reasons:

1. It would eliminate about 25% of the proposed project area so all impacts would be reduced;
2. It would reduce impacts on sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley Aeolian sand corridor, and the habitat of the Mojave Fringe-Toed Lizard by prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields;
3. It would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 2; and
4. It would reduce impacts on primary and secondary desert washes crossing the proposed site.

C.11.8.1 SETTING AND EXISTING CONDITIONS

The Reduced Acreage Alternative would incorporate the following changes from the Reconfiguration Alternative:

1. It would modify the boundaries of Unit 1 as follows:
   - Preclude the use of the northeastern quarter of the westernmost solar field
   - It would reduce and revise the easternmost solar field to avoid the dune habitat
   - It would result in approximately 803 acres or approximately 55% of the Reconfigured Alternative Unit 1 (1,467 acres)
2. It would modify the boundaries of Unit 2 as follows:
   - Eliminate the southernmost segment of Unit 2 (170 acres within Desert Tortoise Critical Habitat)
   - Eliminate the northernmost area of Unit 2 (260 acres of dune sands and MFTL habitat)
   - Add 215 acres to the western end of the second and third rows of solar trough loops to make up for some of the reductions described above.

As such, the setting for the Reduced Acreage Alternative is the same as for the Reconfigured Alternative with the exception of the changes addressed above.

C.11.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The energy from this reduced acreage, 375-MW alternative would still be transmitted to the SCE power grid using transmission line of the same 230-kV rating as proposed for the project. Staff's analysis of the impacts from such line operation addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

The transmission line for the Reduced Acreage Alternative would follow the same route as that for the proposed project, as it is connected to the proposed SCE Red Bluff Substation. The line would (a) be constructed, operated, and maintained according to SCE's guidelines for line safety and field management which conform to applicable laws, ordinances, regulations and standards and (b) would traverse undisturbed desert land with no nearby residents, thereby eliminating the potential for residential electric and magnetic field exposures.

C.11.8.3 CEQA LEVEL OF SIGNIFICANCE

The four conditions of certification recommended for the proposed project would also be recommended for the line needed for this Reduced Acreage Alternative. Any related safety and nuisance impacts would therefore, be less than significant.

C.11.9 NO ACTION ALTERNATIVE

With the No Project/No Action Alternative, the proposed action would not be undertaken. Unless BLM implements an amendment to the CDCA Plan, the BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality [43 U.S.C. 1781 (b)] in conformance with applicable statutes, regulations, policy and land use plan.

There are three No Project/No Action Alternatives evaluated in this section, as follows:

C.11.9.1 NO PROJECT/NO ACTION ALTERNATIVE #1:

No Action on Palen Solar Power Project application and no CDCA land use plan amendment

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the transmission line-related field and nonfield impacts would occur at the project site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.11.9.2 NO PROJECT/NO ACTION ALTERNATIVE #2:

No Action on Palen Solar Power Project and amending the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, the transmission line-related field and nonfield impacts could occur at the similarly insignificant levels staff expects for the proposed project. Different solar technologies produce electric power that would need to be transmitted to the area's power grid. Operating such a line would produce the types of field and nonfield impacts associated with the proposed project line. However, since these lines would be designed and built according to the same SCE design guidelines to be used for the proposed project, the avoided impacts from this. Since the use of these guidelines would result in impacts at insignificant levels, this No Project/No Action Alternative not be at significant levels.

C.11.9.3 NO PROJECT/NO ACTION ALTERNATIVE #3:

No Action on Palen Solar Power Project application and amending the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy

project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the background field and nonfield impacts of concern in this analysis would remain the same in case of this No Project/No Action Alternative. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.11.9.4 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

In the No Project / No Action Alternative, the proposed action would not be undertaken. The BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality [43 U.S.C. 1781 (b)] in conformance with applicable statutes, regulations, policy and land use plan. For example, there are seven large solar projects proposed on BLM land within the area served by the BLM El Centro Field Office, and there are currently 70 applications for solar projects covering 611,692 acres pending with BLM in the California Desert District.

Under the No Project/No Action alternative, the transmission line safety and nuisance impacts of the Palen Solar Power Project would not occur at the proposed site. This would help reduce the total human exposure to area field and non-field impacts from electric power lines in general.

C.11.9.5 CEQA LEVEL OF SIGNIFICANCE

Under all three No Project/No Action alternatives, the transmission line safety and nuisance impacts from the proposed project line would not occur thereby contributing to the general effort to reduce these impacts on humans. However, given the potentially low levels of these line impacts, such contribution to exposure reduction would be less than significant.

C.11.9.6 PROJECT-RELATED FUTURE ACTIONS

As previously noted, SCE proposes to construct the Red Bluff Substation, a new 230/500 kV substation southeast of Desert Center, in eastern Riverside County. The specific location of the Red Bluff Substation has yet to be finalized; however, the substation is expected to be located immediately north of and adjacent to the DPV1 transmission line. The substation would occupy approximately 90 acres (First Solar, 2009). The substation location will be finalized in conjunction with SCE during preparation of the Draft EIS for the DSSF, so that substation impacts can be incorporated into the NEPA analysis of that project.

The substation components will include an undetermined number of 230 kV and 500 kV transmission lines, 230/ 500 kV transformer banks, associated switch racks, and a

microwave tower (First Solar 2009). Other typical substation components include dead-end structures to allow the transmission line to enter the substation, outdoor night lighting to illuminate the switch rack. Large substations like Red Bluff also require a mechanical-electrical equipment room that would house all controls, protective equipment, and a telecommunications room. The tallest component of a 230/500 kV substation would likely be the terminating transmission tower or turning pole, which would range between 150 and 180 feet tall. The tallest component in the switch rack would likely be the dead-end, which would be approximately 130 feet tall.

Other equipment would include disconnect switches, protective relays, metering and Supervisory Control and Data Acquisition (SCADA) system equipment. There would also likely be an emergency power generator, a fire prevention system (including hydrants, water tank, and walls between transformer phases), two single-story relay/control shelters, a single-story storage building, an oil containment system and a radio antenna tower to enhance communications.

A permanent access road would be included to provide vehicular access to the substation (First Solar 2009). The location and length of this road is contingent upon the final location chosen for the substation. The eastern substation site evaluated in this SA/DEIS would require SCE to upgrade an existing transmission line access road over an approximately 4 mile long segment.

Since this Red Bluff Substation would be built under the jurisdiction of the CPUC and BLM, staff would expect implementation of the existing CPUC requirements related to the field and nonfield impacts of concern in this staff analysis. Such implementation should ensure that these impacts would remain within levels of insignificance.

C.11.10 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 (California Code Regulation, Title 14, section 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).

When field intensities are measured or calculated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive or subtractive depending on prevailing conditions. Since the proposed project’s transmission line would be designed, built, and operated according to applicable field-reducing SCE guidelines (as currently required by the CPUC for effective field management), any contribution to cumulative area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contribution levels for the proposed line design would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-2**.

C.11.11 COMPLIANCE WITH LORS

As previously noted, current CPUC policy on safe EMF management requires that any high-voltage line within a given area be designed to incorporate the field strength-reducing guidelines of the main area utility lines to be interconnected. The utility in this case is SCE. Since the proposed project 230-kV line and related switchyards would be designed according to the respective requirements of the LORS listed in **TLSN Table 1**, and operated and maintained according to current SCE guidelines on line safety and field strength management, staff considers the proposed design and operational plan to be in compliance with the health and safety requirements of concern in this analysis. The actual contribution to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-2**.

C.11.12 NOTEWORTHY PUBLIC BENEFITS

Since the proposed PSPP tie-in line would pose specific, although insignificant risks of the field and nonfield effects of concern in this analysis, its building and operation would not yield any public benefits regarding the effort to minimize any human risks from these impacts.

C.11.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

TLSN-1 The project owner shall construct the proposed transmission line (anywhere along the area identified by the applicant as available for its routing) according to the requirements of (a) California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2, (b) the High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, and (3) Southern California Edison's EMF reduction guidelines.

Verification: At least 30 days prior to start of construction of the transmission line or related structures and facilities, the project owner shall submit to 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 line 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 the CPM within 60 days after completion of the measurements.

TLSN-3 The project owner shall ensure that the rights-of-way of the proposed transmission line 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 right-of-way and provide such summaries in the Annual Compliance Report on transmission line safety and nuisance-related requirements.

TLSN-4 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related 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 the CPM a letter confirming compliance with this condition.

C.11.14 CONCLUSIONS

Since staff does not expect the proposed 230-kV transmission line to pose an aviation hazard according to current FAA criteria (anywhere along the area identified by the applicants as available for its routing), we do not consider it necessary to recommend specific location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current SCE guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise.

The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed PSPP and similar transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line's design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed line given the general absence of residences in the immediate vicinity of the proposed route. On-site worker or public exposure would be short term and at levels expected for SCE lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff and would be routed through an area with no

residences in its immediate vicinity , staff considers the proposed design, maintenance, and construction plan as complying with the applicable LORS. With implementation of the four recommended conditions of certification, any such impacts would be less than significant.

C.11.15 REFERENCES

Solar Millennium 2009a (tn:52939) – Application for Certification for the Palen Solar Power Project, Volumes I and II. Submitted to the California Energy Commission on September 24, 2009.

EPRI (Electric Power Research Institute) 1982 – Transmission Line Reference Book: 345 kV and Above.

National Institute of Environmental Health Services 1998 – *An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields*. A Working Group Report, August 1998.

C.12 VISUAL RESOURCES

The Visual Resources Section will be included in the Revised Staff Assessment, Part 2.

C.13 - WASTE MANAGEMENT

Testimony of Suzanne Phinney, D.Env.

C.13.1 SUMMARY OF CONCLUSIONS

Management of the waste generated during construction, operation and closure/decommissioning of the Palen Solar Power Project (PSPP or proposed project) would not generate a significant adverse impact under the California Environmental Quality Act (CEQA) guidelines (Appendix G: Environmental Checklist Section XVI, Utilities and Service Systems). There is sufficient landfill capacity, and the project would be consistent with the applicable waste management laws, ordinances, regulations, and standards if the measures proposed in the Application for Certification and staff's proposed conditions of certification are implemented. Similar to the proposed project, staff considers project compliance with CEQA guidelines; applicable waste management laws, ordinances, regulations, and standards; and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Reconfigured alternative and Reduced Acreage alternative. No cumulative waste management impacts would occur.

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

C.13.2 INTRODUCTION

This section presents an analysis of issues associated with wastes generated from the proposed construction, operation and closure/decommissioning of the proposed project. The technical scope of this analysis encompasses solid and liquid wastes existing on site and wastes that would likely be generated during facility construction, operation and closure/decommissioning. Management and discharge of wastewater is addressed in the **SOIL AND WATER RESOURCES** section of this document. Additional information related to waste management may also be covered in the **WORKER SAFETY** and **HAZARDOUS MATERIALS MANAGEMENT** sections of this document.

The California Energy Commission (Energy Commission) staff's (hereafter referred to as staff) objectives in conducting this waste management analysis are to ensure that:

- the management of project wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction, operation and closure/decommissioning of the proposed project would be managed in an environmentally safe manner.
- the disposal of project wastes would adversely impact existing waste disposal facilities.
- the site is managed in such a way that project wastes and waste constituents would not pose a significant risk to humans or the environment.

C.13.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

In accordance with CEQA guidelines (Appendix G: Environmental Checklist Section XVI, Utilities and Service Systems), staff evaluated project wastes in terms of landfill capacity and LORS compliance, for both non-hazardous and hazardous wastes. The federal, state, and local environmental LORS listed in **Waste Management Table 1** have been established to ensure the safe and proper management of both non-hazardous and hazardous wastes in order to protect human health and the environment.

Waste Management Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 42, United States Code (U.S.C.), §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, including requirements addressing: • Generator record keeping practices that identify quantities of hazardous wastes generated and their disposition; • Waste labeling practices and use of appropriate containers; • Use of a manifest when transporting wastes; • Submission of periodic reports to the United States Environmental Protection Agency (U.S. EPA) or other authorized agency; and • Corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the federal level by U.S. EPA and its 10 regional offices. The Pacific Southwest regional office (Region 9) implements U.S. EPA programs in California, Nevada, Arizona, and Hawaii.

Applicable Law	Description
Title 42, U.S.C., §9601, et seq. Comprehensive Environmental Response, Compensation and Liability Act	The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as *Superfund*, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses: • Reporting requirements for releases of hazardous substances; • Requirements for remedial action at closed or abandoned hazardous waste sites, and brownfields; • Liability of persons responsible for releases of hazardous substances or waste; and • Requirements for property owners/potential buyers to conduct "all appropriate inquiries" into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site, and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA "all appropriate inquiries" requirements.
Title 40, Code of Federal Regulations (C.F.R.), 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. • Part 257 addresses the criteria for classification of solid waste disposal facilities and practices. • Part 258 addresses the criteria for municipal solid waste landfills. • Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). U.S. EPA implements the regulations at the federal level. However, California is a RCRA-authorized state, so most of the solid and hazardous waste regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA.
Title 49, C.F.R., Parts 172 and 173. Hazardous Materials Regulations	These regulations address the United States Department of Transportation (DOT) 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.
Federal Clean Water Act, 33 U.S.C. §1251 et seq.	The Clean Water Act controls discharge of wastewater to the surface waters of the U.S.

Applicable Law	Description
State	
California Health and Safety Code (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 Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (Cal. Code Regs.), 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 standards addressed by Title 22, CAL. CODE REGS. include: • Identification and Listing of Hazardous Waste (Chapter 11, §66261.1, et seq.). • Standards Applicable to Generator of Hazardous Waste (Chapter 12, §66262.10, et seq.). • Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §66263.10, et seq.). • Standards for Universal Waste Management (Chapter 23, §66273.1, et seq.). • Standards for the Management of Used Oil (Chapter 29, §66279.1, et seq.). • Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §67450.1, et seq.). The Title 22 regulations are established and enforced at the state level by DTSC. Some generator and waste treatment standards are also enforced at the local level by CUPAs.

Applicable Law	Description
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 Petroleum Storage Act requirements for Spill Prevention, Control, and Countermeasure (SPCC) Plans. • Hazardous Materials Release and Response Plans and Inventories (Business Plans). • California Accidental Release Prevention (CalARP) Program. • Hazardous Materials Management Plan / Hazardous Materials Inventory Statements. • 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 CUPAs. The DTSC's Calexico Field Office is the CUPA for the SES Solar Two project. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program.
Title 27, Cal. Code Regs., 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).
Public Resources Code, Division 30, §40000, et seq. California Integrated Waste Management Act of 1989	The California Integrated Waste Management Act (CIWMA) establishes mandates and standards for management of solid waste in California. The law addresses solid waste landfill diversion requirements; establishes the preferred waste management hierarchy (source reduction first, then recycling and reuse, and treatment and disposal last); sets standards for design and construction of municipal landfills; and addresses programs for county waste management plans and local implementation of solid waste requirements.
Title 14, Cal. Code Regs., Division 7, §17200, et seq. California Integrated Waste Management Board	These regulations implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions. • Chapter 3 – Minimum Standards for Solid Waste Handling and Disposal. • Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste. • Chapter 7 – Special Waste Standards. • Chapter 8 – Used Oil Recycling Program. • Chapter 8.2 – Electronic Waste Recovery and Recycling.

Applicable Law	Description
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	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 (approximately 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a four-year cycle, with a summary progress report due to DTSC every fourth year.
Title 22, Cal. Code Regs., §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.
Title 23, Cal. Code Regs., Division 3, Chapters 16 and 18	These regulations relate to hazardous material storage and petroleum UST cleanup, as well as hazardous waste generator permitting, handling, and storage. The DTSC Imperial County CUPA is responsible for local enforcement.
Local	
County of Riverside General Plan, Safety Element: Policy S 6.1	Describes the County's policies and siting criteria identified in the County of Riverside Hazardous Waste Management Plan including coordination of hazardous waste facility responsibilities on a regional basis through the Southern California Hazardous Waste Management Authority
Riverside County Code Title 8 Chapters 8.60, 8.84, and 8.132, Health and Safety	Establishes requirements for the use, generation, storage, and disposal of hazardous and non-hazardous materials and wastes within the County.
Riverside County Code, Chapter 8.32, Ordinance No. 787, Fire	Adopted the 2007 California Fire Code.

C.13.4 PROPOSED PROJECT

C.13.4.1 SETTING AND EXISTING CONDITIONS

Proposed Project

The proposed PSPP site encompasses 5,200 acres and is located approximately 0.5 miles north of U.S. Interstate-10 and approximately 10 miles east of the community of Desert Center, in an unincorporated area of Riverside County, California. The site is located on vacant, undisturbed public land administered by the Bureau of Land Management (BLM). A single privately owned 40-acre parcel is enclosed by the site boundaries; this parcel is under purchase option by Palen Solar, LLC[1] (applicant).

[1] Chevron Energy Solutions and Solar Millennium have a joint development agreement. Chevron Energy Solutions applied for the Right of Way for Palen Solar Power Project. To facilitate the permitting of the Palen Solar Power Project (PSPP), the Applicant is requesting that the CEC issue one license to a project- specific company. The company for PSPP is Palen Solar I, LLC a wholly owned subsidiary of Solar Millennium and the single Applicant for the PSPP.

Permanent facilities would have a combined footprint of approximately 2,970 acres, plus a single-circuit 230-kilovolt (kV) transmission line to interconnect the project to Southern California Edison's proposed Red Bluff substation. Two locations (to the west of the project site) are under consideration for the 90-acre substation; transmission corridor distances would be 5.25 miles and 11.75 miles, respectively.

The proposed project site is vacant and largely undisturbed; the only existing structure on the site is Southern California Edison's Eagle Mountain-Blythe 161 kV transmission line that traverses and would be rerouted along the border of the southwestern portion of the site. Three identified desert washes traverse the site; these washes originate from culverts built under the I-10 freeway when the freeway was constructed in the late 1960s (Solar Millennium 2009a, page 2-4). The proposed project site is in an area shown on maps as the Chuckwalla Valley, and is 2 to 3 miles northeast of the Chuckwalla Mountains and approximately 2 miles southwest of the Palen Mountains (Solar Millennium 2009a, page 2-4).

The proposed project would use solar parabolic trough technology to generate electricity, and would consist of two nominally rated 250 megawatt (MW) power blocks that would be constructed in two phases. It is anticipated that construction would begin in late 2010 and continue through the fourth quarter of 2013. Commercial operation of Unit #1 is expected to begin in mid 2013, with commercial operation of Unit #2 following by the end of 2013. The two power generating units would share a main office building, a main warehouse and maintenance facility, a laydown area, a 200-vehicle parking lot, and on-site access roads. A central internal switchyard would serve both units. Each solar unit would have its own HTF system (which includes a HTF heat exchanger, HTF expansion vessel and overflow vessel, and HTF system) and 4-acre land treatment unit for bioremediation of HTF-contaminated soil. They would also each have a water treatment system, two 4-acre evaporation ponds, and two covered water tanks.

In addition to the two power generating units, the proposed project components include the following:

- Two dry-cooled solar parabolic trough fields and associated electrical equipment and infrastructure within a fenced boundary.
- A new 24-foot wide and 1,000-foot long paved access road from Corn Springs Road to the project site.
- A new single-circuit 230 kV transmission line to interconnect the proposed project with the proposed SCE Red Bluff Substation.
- On-site groundwater wells (up to ten), water pipelines, and two water treatment facilities to purify water for washing the mirrored surfaces of the parabolic troughs and other project uses.
- Drainage ditches to reroute the existing pattern of drainage at the site.

Refer to **Section B.1** for a more detailed description of the proposed project and accompanying figures identifying project features and facilities.

C.13.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This waste management analysis addresses: a) existing project site conditions and the potential for contamination associated with prior activities on or near the project site, and b) the impacts from the generation and management of wastes during project construction, operation and closure/decommissioning.

Existing Project Site Conditions and Potential for Contamination

For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the CEQA significance of the release or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed use of the area where the contaminants/contamination is found; and any potential pathways for workers, the public, or sensitive species or environmental areas to be exposed to the contaminants. Any unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors would be considered significant under CEQA by staff.

As a first step in documenting existing site conditions, the Energy Commission's power plant site certification regulations require that a Phase I Environmental Site Assessment (ESA) be prepared[2] and submitted as part of an Application for Certification (AFC). The Phase I ESA is conducted to identify any conditions indicative of releases and threatened releases of hazardous substances at the site and to identify any areas known to be contaminated (or a source of contamination) on or near the site.

In general, the Phase I ESA uses a qualified environmental professional to conduct inquiries into past uses and ownership of the property, research hazardous substance releases and hazardous waste disposal at the site and within a certain distance of the site, and visually inspect the property, making observations about the potential for contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the environmental professional then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the environmental professional may also give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were significant gaps in the information available about the site, if an ongoing release is suspected, or to confirm an existing environmental condition.

If additional investigation is needed to identify the extent of possible contamination, a Phase II ESA may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and the potential for remediation at the site.

[2] Title 20, California Code of Regulations, section 1704(c) and Appendix B, section (g)(12)(A). Note that the Phase I ESA must be prepared according to American Society for Testing and Materials protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

In conducting its assessment of a proposed project, staff will review the project's Phase I ESA and work with the appropriate oversight agencies as necessary to determine if additional site characterization work is needed and if additional mitigation is necessary to ensure protection of human health and the environment from hazardous substance releases and on-site contamination.

A Phase I Environmental Site Assessment (ESA), dated May 2009, was prepared by AECOM in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 for ESAs. The Phase I ESA is included as Appendix I of the project's AFC. The ESA did not identify any Recognized Environmental Conditions (REC) in connection with historic or current site operations. A REC is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicated an existing release, past 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.

Impacts from Generation and Management of Wastes during Construction, Operation and Project Closure/Decommissioning

As mentioned previously, staff considers project waste management to result in no significant adverse impacts (as defined per CEQA guidelines in Checklist Section XVI) if there is available landfill capacity, and the project complies with LORS. Staff thus reviewed the applicant's proposed solid and hazardous waste management methods regarding the management of project-related wastes generated during construction, operation, and closure/decommissioning of the proposed project to determine whether the methods proposed are consistent with the LORS identified for waste disposal and recycling. Staff then reviewed the capacity available at off-site treatment and disposal sites to determine whether or not the proposed power plant's waste would impact the available capacity.

The handling and management of waste generated by the PSPP would follow the hierarchical approach of source reduction, recycling, treatment, and disposal as specified in California Public Resources Code Sections 40051 and 40196. The first priority of the project owner is to use materials that reduce the waste that is generated. The next level of waste management would involve reusing or recycling wastes. For wastes that cannot be recycled, treatment will be used, if possible, to make the waste nonhazardous. Finally, waste that cannot be reused, recycled or treated would be transported off site to a permitted treatment, storage, or disposal facility.

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan), have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission. This Compliance Plan will include Conditions of Certification identified in the following sections.

C.13.4.3 DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions

Photographs, maps, and other historic records reviewed as part of the Phase I ESA indicate the site has been historically undeveloped and vacant, aside from a power line and associated unpaved access roads, an unused corral, and an historic groundwater well. No hazardous materials sites of concern are located on the proposed project site or within a one-mile radius of the subject property (AECOM, 2009). Although a power line traverses the proposed project site, no evidence of transformers or other equipment potentially containing polychlorinated biphenyls (PCB) was observed during the March 17 and 18, 2009 site reconnaissance conducted by AECOM.

The Phase I ESA does not mention the potential presence of unexploded ordnance (UXO) at the PSPP site. Historical use of the site included General George Patton's Desert Training Camps during World War II. The PSPP site is near Palen Pass, which was the site of some of the largest mock battles in the California-Arizona Maneuver Area. Live-fire training occurred in camps and facilities in the area and convention and unconventional land mines and improvised personnel mines have been detected in addition to UXO. Due to the proximity of the PSPP site to Palen Pass and the camps, the applicant plans to conduct pre-construction UXO surveys with qualified technicians (that meet Department of Defense requirements) and/or employ UXO experts during ground disturbances in areas that may contain UXO (AECOM 2010a, DR-WM-279). The applicant also provided an outline for the MEC/UXO Recognition Training Program

in its response to staff data request WM-280 (AECOM 2010a). Accordingly, staff proposes Condition of Certification **WASTE-1**, which would formalize UXO training, investigation, removal, and disposal.

In the event that contamination is identified during any phase of construction, staff proposes Condition of Certification **WASTE-2**, which would require that an experienced and qualified Professional Engineer or Professional Geologist be available for consultation in the event contaminated soil is encountered. If contaminated soil is identified, **WASTE-3** would require that the Professional Engineer or Professional Geologist inspect the site, determine what is required to characterize the nature and extent of contamination, and provide a report to the Energy Commission Compliance Project Manager (CPM) and DTSC with findings and recommended actions.

Proposed Project

Proposed Project – Construction Impacts and Mitigation

Site preparation and construction of the two phases of the proposed solar project and its associated facilities would last approximately 3 years (39 months) and generate non-hazardous, universal, and hazardous wastes in solid and liquid forms. Before construction begins, the project owner would develop and implement a Construction Waste Management Plan to ensure that waste is recycled when possible and properly landfilled as necessary. Proposed Condition of Certification **WASTE-4** would require the project owner to submit the Construction Waste Management Plan to the CPM at least 30 days prior to the start of construction activities.

Non-Hazardous Waste

Construction activities would generate an estimated 70 cubic yards per week of non-hazardous solid wastes, consisting of scrap wood, concrete, steel, glass, plastic, paper, insulating materials, aluminum, and food waste. For all construction waste, recyclable materials would be separated and removed to recycling facilities; non-recyclable materials would be disposed of at a Class III landfill.

Wastewater would be generated during construction, and would include storm water runoff, sanitary waste, dust suppression drainage, and equipment wash water. Storm water runoff would be managed in accordance with appropriate LORS. Sanitary wastes would be pumped to tanker trucks by licensed contractors for transport to a sanitary water treatment plant. Potentially contaminated equipment wash water would be contained at designated wash areas and transported to a wastewater treatment facility via a licensed hauler. Please see the **SOIL AND WATER RESOURCES** section of this document for more information on the management of project wastewater.

Universal Waste

Anticipated universal waste generated during construction includes: spent batteries (e.g., alkaline dry cell, nickel-cadmium, and lithium ion) and empty or nonempty aerosol cans. Estimated quantities are 40 spent batteries (in 3 years) and eight drums of aerosol cans (per year). Spent batteries and aerosol cans would be recycled by licensed universal waste handlers.

Universal waste would be accumulated for less than one year and recycled off site.

Hazardous Waste

During construction, anticipated hazardous waste includes empty hazardous material containers; solvents, used oil, paint, and oily rags; heat exchanger cleaning waste (chelant-type solution); and flushing and cleaning wash water. Estimated quantities are: one cubic yard of empty containers (per week), 175 gallons of solvents, used oil, paint, and oily rags (every 90 days), 1,000 gallons of heat exchanger cleaning waste (once per power plant field), and variable amounts of flushing and cleaning wash water. Empty hazardous material containers would be returned to the vendor or disposed of at a hazardous waste facility; solvents, used oils, paint, and oily rags would be disposed of at a hazardous waste facility, recycled, or used for energy recovery; heat exchanger cleaning waste would be disposed of at a permitted hazardous waste disposal facility; and flushing and cleaning wash water would be recycled, used for energy recovery, or disposed of depending on specific waste stream characteristics (Solar Millennium 2009a, pages 5.16-14 to 5.16-16).

In the unlikely event that contaminated soil is encountered during excavation activities, the soil would be segregated, sampled, and tested to determine appropriate disposal and treatment options. If the soil is classified as hazardous, the Riverside County Department of Environmental Health would be notified and the soil hauled to a Class I landfill or other appropriate soil treatment and recycling facility, as required. The Riverside County Department of Environmental Health would be notified also if previously unknown wells, tanks, or other underground storage facilities are discovered during construction. Subsequent removal of such equipment, including potential remediation activities, would be conducted in accordance with applicable LORS (Solar Millennium 2009a, pages 5.16-15 and 5.16-16). Staff believes that proposed Conditions of Certification **WASTE-2** and **-3** would be adequate to address any soil contamination contingency that may be encountered during construction of the project and would further support compliance with LORS.

The generation of hazardous waste requires a unique hazardous waste generator identification number. The hazardous waste generator number is determined based on site location and therefore, both the construction contractor and the PSPP project owner/operator could be considered the generator of hazardous wastes at the site. The PSPP project owner would obtain a unique hazardous waste generator identification number for the site prior to starting construction. This would ensure compliance with California Code of Regulation Title 22, Division 4.5. Proposed Condition of Certification **WASTE-5** would require the PSPP project owner to submit the notification and issued identification number documentation to the CPM.

Hazardous wastes would be collected in hazardous waste accumulation containers and stored in a laydown area, warehouse area, or storage tank on equipment skids for less than 90 days (or less than 180 days in the case of lead acid batteries). The accumulated wastes would then be properly manifested, transported, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal firms. Staff reviewed the disposal methods and concluded that all wastes would be disposed of in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-6** to notify the CPM whenever the owner becomes aware of such action.

Staff has reviewed the proposed waste management methods described in AFC section 5.16.4 and concludes that project construction wastes would be managed in accordance with all applicable LORS. Absent any unusual circumstances, staff considers project compliance with LORS and staff's proposed conditions of certification to be sufficient to ensure that no significant adverse impacts would occur (per CEQA Guidelines) as a result of construction waste management activities.

Proposed Project – Construction and Demolition (C&D) Waste Diversion and Mitigation

The Integrated Waste Management Act of 1989 [Assembly Bill (AB) 939, Sher, Chapter 1095, Statutes of 1989] set landfill waste diversion goals of 50% (by 2000) for local jurisdictions. To meet this goal, many jurisdictions require applicants for construction and demolition projects to submit a reuse/recycling plan for at least 50% of C&D materials prior to the issuance of a building or demolition permit. While the proposed project is not responsible to a local jurisdiction (Riverside County does not have a construction and demolition waste diversion ordinance), staff encourages the applicant to meet the 50% waste diversion rate.

Proposed Project – Operation Impacts and Mitigation

The proposed project would generate non-hazardous, universal, and hazardous wastes in solid and liquid forms under normal operating conditions. Table 5.16-6 of the project AFC gives a summary of the anticipated operation waste streams, estimated waste volumes and generation frequency, and proposed management methods. This information is presented below in **Waste Management Table 2**.

Waste Management Table 2
Summary of Operation Waste Streams and Management Methods

Waste Stream and Classification[1]	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				Onsite	Offsite
Used hydraulic fluid, oils and grease – Non-RCRA hazardous	HTF system, turbine, and other hydraulic equipment	100,000 gallons/year	Intermittent	Accumulated for <90 days	Recycle
Effluent from oily water separation system – Non-RCRA hazardous	Plant wash down area/oily water separation system	6,000 gallons/year	Intermittent	None	Recycle
Oil absorbent, and oil filters – Non-RCRA hazardous	Various	Ten 55-gallon drums per month	Intermittent	Accumulated for <90 days	Sent off site for recovery or disposal at Class I landfill.
Dirty shop rags – recyclable material	Maintenance cleaning operations	100 pounds per month	Routine	None	Sent to commercial laundry for cleaning and recycling.

Waste Stream and Classification[1]	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				Onsite	Offsite
Spent carbon – RCRA hazardous	Spent activated carbon from air pollution control of HTF vent	90,000 pounds/year	Intermittent	Contained in engineered process vessel, no accumulation outside of process	Sent off site for regeneration at a permitted management facility.
Soil contaminated with HTF (>10,000 milligrams per kilogram [mg/kg]) – Non-RCRA hazardous	Solar array equipment leaks	20 cy/year	Intermittent	Accumulated for <90 days	Sent off site for disposal at a Class I landfill or to soil thermal treatment facility.
Soil contaminated with HTF (<10,000 mg/kg) – Non-hazardous	Solar array	1,500 cy/year	Intermittent	Bioremediation or land farming at Land Treatment Unit	Disposal at permitted waste management facility.
Spent batteries – Universal Waste	Batteries containing heavy metals such as alkaline dry cell, nickel-cadmium, or lithium ion.	<20/month	Continuous	Accumulate for <1 year	Recycle
Spent batteries – Hazardous (exempt if managed as prescribed by Title 22 CCR Chapter 16).	Lead acid	40 every 2 years	Intermittent	Accumulated for <180 days	Recycle
Spent fluorescent bulbs or high-intensity discharge lamps – Universal Waste	Facility lighting	<100 per year	Intermittent	Accumulate for <1 year	Recycle
Spent demineralizer resin – Non-hazardous	Demineralizer	500 cubic feet (ft^3)	Once every 3 years	None	Recycle
Reverse Osmosis (RO) Membrane Cleaning Waste – Non-hazardous	Acidic and/or caustic chemicals	6,000-12,000 gallons per cleaning	Up to 4 times per year	Adjust pH and use as dust suppressant	Disposal at permitted waste management facility.
RO system concentrate – Inert or liquid designated waste – Non-hazardous	Auxiliary cooling tower and boiler blowdown	TBD	Routine	Used for dust control (if inert waste)	Disposal at permitted waste management facility if designated waste.

Waste Stream and Classification[1]	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				Onsite	Offsite
Auxiliary cooling tower basin sludge – Non-hazardous	Auxiliary cooling tower	2,000 pounds/year	Annually	None	Disposal at permitted waste management facility.
Spent softener resin – Non-hazardous	Softener	1,000 ft^3	Once every 3 years	None	Recycle
Damaged parabolic mirrors – Non-hazardous	Metals and other materials	TBD	Rare	None	Recycle for metal content and/or other materials or send for landfill disposal.
Sanitary wastewater – Non-hazardous	Toilets, washrooms	5,500 gallons/day	Continuous	Septic leach field	None

Notes:
1 - Classification under Title 22 CCR Division 4.5, Chapters 11, 12, and 23.

The project owner would develop and implement an Operations Waste Management Plan. In addition, the project owner would be required to document the project's actual operational waste stream and obtain approval for the Operations Waste Management Plan prior to the start of construction per proposed Condition of Certification **WASTE-7**. These measures would ensure that operational wastes are treated in compliance with all LORS and that an accurate record of the project's waste generation, storage, and disposal practices is maintained.

Heat Transfer Fluid Releases

The PSPP would use Therminol VP-1™ (a synthetic oil consisting of diphenyl ether and biphenyl) for the heat transfer fluid (HTF). Approximately 8,300 metric tons of Therminol VP-1™ would be present within each field's solar system, including the piping and necessary expansion tanks; no additional HTF would be stored on site (Solar Millennium 2009a, page 5.6-19).

Occasional spills of HTF from either equipment failure or human error can result in the generation of contaminated soil. HTF spills typically spread laterally on the bare ground and soak down to a relatively shallow depth. The contaminated soil is regulated as a hazardous material by the State of California due to the constituent biphenyl. Biphenyl is listed in Title 22, CCR, Chapter 11 Appendix X (list #299) as an extremely hazardous waste. The listing of a chemical in Appendix X creates the regulatory presumption that a waste containing that chemical (i.e. HTF contaminated soil) is hazardous unless determined otherwise, pursuant to specified procedures. The determination is required to be based on criteria and lists in Title 22, California Code of Regulations, Section 66261.1 et seq., which identify hazardous wastes subject to regulation. DTSC made a 1995 determination that a 10,000 mg/kg concentration of HTF would be assumed hazardous for SEGS III-VI at Kramer Junction. This determination, however, cannot be extrapolated to the proposed project, and DTSC has indicated that determination of

whether a discharge of HTF constitutes a hazardous waste would have to be made on a case by case basis (CEC2009t). Once a history of discharges has been established, the applicant may petition DTSC for its concurrence on a standardized waste classification for HTF contaminated soils generated at the facility (title 22, CCR, section 66260.200(d)). Depending on DTSC findings an operator could modify their operations to standardize treatment and eliminate the need for case by case determinations.

Title 22, CCR, section 66260.200(f) places the responsibility of determining whether a waste must be classified as hazardous on the generator of that waste. The PSPP project owner would therefore be required to assess the waste classification for HTF-impacted soils at the PSPP facility in consultation with the Energy Commission, BLM, DTSC, and Colorado River Basin Regional Water Quality Control Board (RWQCB).

The applicant estimates that 1500 cubic yards per year of soil contaminated with HTF (see Waste Management Table 2) would be bioremediated (aeration plus nutrients) or land farmed (aeration only) and approximately 20 cubic yards of HTF-contaminated soil would be sent for disposal at a permitted Class I landfill. The two solar fields would share the same Land Treatment Unit (LTU) to bioremediate or land farm the contaminated soils; the applicant anticipates that offsite disposal would be used for soils with HTF levels greater than 10,000 mg/kg, bioremediation would be used for soils with HTF levels between 1,000 and 10,000 mg/kg, and land farming would be used for soils with HTF levels between 100 mg/kg and 1,000 mg/kg. Soils with HTF levels below 100 mg/kg would be stockpiled on site and used on site as needed (Solar Millennium 2009a, page 5.16-21). The LTU would be constructed with a clay liner at least 5 feet deep per Title 27 requirements; monitoring would be used to evaluate liner integrity (see **SOIL AND WATER RESOURCES** section).

The PSPP project owner would develop and implement an Operations Waste Management Plan, which would include: a discussion of the appropriate frequency for characterizing HTF-contaminated soils; the level of HTF in soil that would be considered hazardous waste; and sampling and testing protocols for HTF-contaminated soils. In addition, the project owner would be required to document the project's actual operational waste stream and obtain approval for the Operations Waste Management Plan prior to the start of construction per proposed Condition of Certification **WASTE-7**. These measures would ensure that HTF-contaminated soils are treated in compliance with all LORS.

The applicant's proposed treatment and disposal methods are generally consistent with and would provide for compliance with the Requirements for Waste Discharge established by the Colorado River RWQCB and presented in the **SOIL AND WATER RESOURCES** section of this document. Staff proposes Condition of Certification **WASTE-8** to address the Requirements of Waste Discharge. This would require the applicant to comply with the requirements for accidental discharges of HTF associated with the operation of the project and ensure that hazardous concentrations of contaminated HTF-soil will not be treated in the LTU. With implementation of Condition of Certification **WASTE-8** there would be no significant adverse impacts under CEQA due to HTF spills during project operation.

Non-Hazardous Waste

Proposed project operation would generate an estimated 30 cubic yards of non-hazardous solid waste per week. Non-hazardous solid wastes generated during project operations would consist of dirty shop rags, HTF-contaminated soil, spent demineralizer resin, auxiliary cooling tower basin sludge, spent softener resin, damaged parabolic mirrors, used air filters, office paper, newsprint, aluminum cans, plastic and glass containers, and other miscellaneous domestic and office waste. Estimated quantities are: 100 pounds of dirty shop rags (per month); 1,500 cubic yards of soil contaminated with HTF at less than 10,000 milligrams per kilogram (per year); 500 cubic feet of spent demineralizer resin (once every 3 years); 2,000 pounds of auxiliary cooling tower basin sludge (per year); 1,000 cubic feet of spent softener resin (once every 3 years); and variable amounts of damaged parabolic mirrors and other waste.

Dirty shop rags would be sent to a commercial laundry for cleaning and recycling; spent demineralizer resin would be recycled; auxiliary cooling tower basin sludge would be disposed of at a permitted waste management facility; spent softener resin would be recycled; and damaged parabolic mirrors would be recycled to the extent possible and the remainder disposed of at a Class III facility.

Occasional spills and leaks of HTF are anticipated as a result of unavoidable equipment failures during operation of the proposed project. As discussed above, soil contaminated with HTF at a concentration less than 10,000 milligrams per kilogram (or other threshold value to be determined by DTSC) would be treated on site at the land treatment unit stockpiled on site, and used on site as fill material as needed.

The remaining non-hazardous solid wastes would be recycled to the greatest extent possible, and the remainder would be removed on a regular basis for disposal in a Class III landfill.

Non-hazardous liquid wastes would be generated during facility operation and would include reverse osmosis membrane cleaning waste, reverse osmosis system concentrate, sanitary wastewater, and storm water runoff. Quantities would include 6,000 to 12,000 gallons of reverse osmosis membrane cleaning waste per cleaning (up to 4 times per year) and 5,500 gallons of sanitary wastewater (per day). The quantity of reverse osmosis system concentrate has not yet been determined, but would be classified as either inert or designated waste.

Reverse osmosis membrane cleaning waste would be adjusted to neutralize its pH and used as a dust suppressant on site or disposed of at a permitted waste management facility. Sanitary waste water would be piped to an on-site septic system and leach field. Reverse osmosis system concentrate would be used for dust control if determined to be inert or disposed of at a permitted waste management facility if determined to be designated waste.

Stormwater runoff is discussed in the **SOIL AND WATER RESOURCES** section of this document.

Universal Waste

Project operations would generate universal waste, including: spent batteries (e.g., alkaline dry cell, nickel-cadmium, and lithium ion) and spent fluorescent bulbs or high-intensity discharge lamps. Estimated quantities are fewer than 240 spent batteries (per year) and fewer than 100 spent fluorescent bulbs (per year).

Universal waste would be accumulated for less than one year and recycled off site.

Hazardous Waste

Project operations would generate hazardous wastes, including: used hydraulic fluid, oils, and grease associated with the HTF system, turbine, and other hydraulic equipment; effluent from the oily water separation system resulting from plant wash down; oil adsorbent and oil filters; spent carbon from air pollution control of the HTF vent; soil contaminated with HTF as a result of solar array equipment leaks; and spent lead acid batteries. Estimated quantities include: 100,000 gallons of used hydraulic fluid, oils, and grease (per year); 6,000 gallons of effluent from the oily water separation system (per year); 10 55-gallon drums of oil adsorbent and oil filters (per month); 20 cubic yards of soil contaminated with HTF at concentrations greater than or equal to 10,000 milligrams per kilogram (per year); and 40 lead acid batteries (every 2 years).

Used hydraulic fluid, oils, and grease would be recycled; effluent from the oily water separation system would be recycled; oil adsorbent and oil filters would be sent offsite for recovery or disposal at a Class I landfill; spent activated carbon would be sent off site for regeneration at a permitted management facility; HTF-contaminated soil (concentration greater than 10,000 mg/kg) would be sent off site for disposal at a Class I landfill or to a soil thermal treatment facility; and spent lead acid batteries would be recycled (Solar Millennium 2009a, pages 5.16-16 through 5.16-20).

Spills of HTF used during project operations may result in soils contaminated with high levels of HTF. Soil contaminated with HTF at a concentration greater than or equal to 10,000 milligrams per kilogram (or other threshold value to be determined by DTSC) would be considered hazardous waste and would be collected on site and transported by a licensed transporter to and disposed of at a Class I landfill or licensed recycling facility.

The PSPP project owner would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the PSPP project owner's unique hazardous waste generator identification number, obtained prior to construction, would be retained and used for hazardous waste generated during facility operation.

Proper hazardous material handling, good housekeeping practices, and personnel training would help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, staff proposes Condition of Certification **WASTE-9,** requiring the project operator to document, clean up, and properly manage and dispose of wastes from any hazardous materials spills or releases in accordance with all applicable federal, state,

and local requirements. More information related to hazardous materials management is provided in the **HAZARDOUS MATERIALS MANAGEMENT** section of this document.

The hazardous wastes generated during proposed project operations would be temporarily stored on site, transported off site by licensed hazardous waste haulers, and recycled or disposed of at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, Cal. Code Regs., §66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-6** to notify the CPM when advised of any such action.

Proposed Project – Closure and Decommissioning Impacts and Mitigation

The closure or decommissioning of the proposed project would produce both hazardous and non-hazardous solid and liquid waste. The applicant did not identify waste streams or quantities of materials requiring disposal from decommissioning. Required elements of a facility's closure would be outlined in a facility closure plan as specified in Conditions of Certification **COMPLIANCE-11, -12**, and **-13** (see **Section E.1**) To ensure adequate review of a planned project closure, the PSPP project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to commencement of closure activities. The facility closure plan will document non-hazardous and hazardous waste management practices including: the inventory, management, and disposal of hazardous materials and wastes, and permanent disposal of permitted hazardous materials and waste storage units. The plan will identify landfills with adequate capacity to receive closure and decommissioning wastes.

Conditions of Certification **WASTE-1** through **-10** would continue to apply to the proposed project during closure and decommissioning of the project.

Proposed Project – Impact on Existing Waste Disposal Facilities

Non-Hazardous Waste

Construction of the proposed project would generate 70 cubic yards and operation would generate approximately 33.5 cubic yards per week of nonhazardous solid waste. The waste would be stored on site in appropriate containers and recycled or disposed of in a Class III landfill on a regular basis.

Table 5.16-4 of the project AFC identifies six Class III waste disposal facilities in Riverside County that could potentially accommodate the non-hazardous construction and operation wastes generated by the proposed project. The combined remaining capacity of these six landfills is over 160 million cubic yards; however, the remaining capacity of the Oasis Sanitary Landfill is only 75,727 cubic yards, and the remaining capacity of the Desert Center Landfill, which is expected to close in 2011, is only 23,246 cubic yards (Solar Millennium 2009a, page 5.16-10).

The total amount of non-hazardous solid waste generated from project construction is estimated to be 11,830 cubic yards (70 cubic yards per week for 39 months), and the

total amount from lifetime operations is estimated to be 52,260 cubic yards or more (33.5 cubic yards per week for 30 years or more). These quantities include both recyclable and non-recyclable wastes, and the operations waste stream value includes a substantial amount of HTF-contaminated soil that would be treated and reused on site. If reverse osmosis membrane cleaning waste is not combined with dust control water and spread on roads, up to 7,200 cubic yards could require disposal over the project lifetime. As noted above, type and quantity of waste for closure and decommissioning have not been identified. The facility closure plan prepared pursuant to Conditions of Certification **COMPLIANCE-11, -12** and **-13** will provide this information as well as disposal facilities with adequate capacity to receive wastes.

The non-recyclable, non-reusable component of the waste stream would contribute much less than 1% of the available Class III landfill capacity in Riverside County, but could contribute a substantial portion of the remaining capacity at the Desert Center Landfill and the Oasis Sanitary Landfill. Condition of Certification **WASTE-10** would require that all project-related non-hazardous, non-recyclable, and non-reusable construction and operation waste be diverted to Riverside County landfills other than the Desert Center Landfill and the Oasis Sanitary Landfill. Disposal of the non-hazardous solid wastes generated by the proposed project could occur without impacting the capacity or remaining life of the other Class III facilities in Riverside County.

Hazardous Waste

Table 5.16-4 of the project AFC identifies two Class I waste disposal facilities in Riverside County that are currently accepting waste and could be used to manage proposed project wastes: the Clean Harbors Buttonwillow Landfill in Kern County and the Chemical Waste Management Kettleman Hills Landfill in Kings County. In total, there is a combined excess of 10 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with at least 30 years remaining in their operating lifetimes (Solar Millennium 2009a, page 5.16-11). In addition, the Kettleman Hills facility is in the process of permitting an additional 4.6 to 4.9 million cubic yards of disposal capacity (Waste Management 2009).

Hazardous wastes generated during construction, operation and closure/decommissioning would be recycled to the extent possible and practical. Those wastes that cannot be recycled would be transported off site to a permitted treatment, storage, or disposal facility. As calculated from waste streams presented in AFC Tables 5.16-5 and 5.14-6 (Solar Millennium 2009a, pages 5.16-14 through 5.16-16), approximately 190 cubic yards of recyclable and non-recyclable hazardous waste would be generated over the 39-month construction period, and approximately 1,590 cubic yards of non-recyclable hazardous waste would be generated over the 30-year operating lifetime. Thus the quantity of hazardous wastes from the proposed project requiring off-site disposal would be up to approximately 0.02% of the combined remaining capacity of the two Class 1 waste facilities.

C.13.4.4 CEQA LEVEL OF SIGNIFICANCE

Absent any unusual circumstances, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant impacts would occur as a result of project waste management.

The existing available capacity for the Class III landfills that may be used to manage nonhazardous project waste exceeds 140 million cubic yards. The total amount of non-hazardous waste generated from construction, operation and closure/decommissioning of the proposed project would contribute much less than 1% of the projected landfill capacity. Therefore, disposal of project-generated non-hazardous waste would have a less-than-significant adverse impact on Class III landfill capacity.

In addition, the two Class I disposal facilities that could be used for hazardous waste generated by the construction, operation and closure/decommissioning of the proposed project have a combined remaining capacity in excess of 10 million cubic yards, with another 4.6 to 4.9 million cubic yards of proposed capacity. The total amount of hazardous wastes generated by the proposed project would not impact the remaining Class I permitted capacity.

C.13.5 RECONFIGURED ALTERNATIVE #1

The Reconfigured Alternative #1 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

This alternative is analyzed because

1. It would retain the 500 MW generation capacity defined for the proposed project and the engineering is defined by Solar Millennium as feasible;
2. It reduces impacts to the primary and secondary desert washes that cross the proposed site; and
3. It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

C.13.5.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the Solar Millennium Palen Right of Way (ROW) application area but the alternative would remain entirely within BLM managed lands. This alternative includes use of the proposed Unit 2 (the western solar field) in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. The setting for Unit 2 would be similar to that for the proposed project.

C.13.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Reconfigured Alternative #1 would generate similar types and quantities of hazardous and non-hazardous wastes from construction, operation and closure/decommissioning as the proposed project. The amount of non-hazardous and hazardous solid wastes generated under a Reconfigured alternative that would require landfill/treatment over the life of the project would be approximately 64,090 cubic yards and 1,780 cubic yards,

respectively. Closure/decommissioning waste type and quantities are not identified at this time; a facility closure plan will identify waste quantities and landfills with adequate capacity. Similar to the proposed project, wastes requiring off-site disposal would not impact the remaining capacity of off-site disposal facilities. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification (**WASTE-1** through **-10** and **COMPLIANCE-11** through **-13)** would apply.

C.13.5.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Reconfigured Alternative #1.

C.13.6 RECONFIGURED ALTERNATIVE #2

Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.13.6.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be similar to that for the proposed project. A portion of the southeast corner extends beyond the boundary of the original proposed project, and it is not clear whether the Phase I ESA submitted with the AFC would include the extended land. Implementation of **WASTE-1** through **WASTE-3** would address any potential contamination that may be present on the extended portion of land.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

C.13.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Reconfigured Alternative #2 would generate similar types and quantities of hazardous and non-hazardous wastes from construction, operation and closure/decommissioning as the proposed project. The amount of non-hazardous and hazardous solid wastes generated under a reconfigured alternative that would require landfill/treatment over the life of the project would be approximately 64,090 cubic yards and 1,780 cubic yards, respectively. Closure/decommissioning waste type and quantities are not identified at this time; a facility closure plan will identify waste quantities and landfills with adequate capacity. Similar to the proposed project, wastes requiring off-site disposal would not impact the remaining capacity of off-site disposal facilities. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification (**WASTE-1** through **-10** and **COMPLIANCE-11** through **-13)** would apply.

C.13.6.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with Reconfigured Alternative #2.

C.13.7 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.13.7.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern half of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located on primarily on public land managed by BLM; however, as with the proposed project, it would include a 40 acre private parcel on which the applicant has a purchase option. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project. However, a portion of the southeast corner extends beyond the boundary of the subject property of

the original proposed project, and may not have been surveyed under the Phase I ESA. Implementation of **WASTE-1** through **WASTE-3** would address any potential contamination that may be present on the extended portion of land.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

C.13.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Reconfigured Alternative #3 would generate similar types and quantities of hazardous and non-hazardous wastes from construction, operation and closure/decommissioning as the proposed project. The amount of non-hazardous and hazardous solid wastes generated under a reconfigured alternative that would require landfill/treatment over the life of the project would be approximately 64,090 cubic yards and 1,780 cubic yards, respectively. Closure/decommissioning waste type and quantities are not identified at this time; a facility closure plan will identify waste quantities and landfills with adequate capacity. Similar to the proposed project, wastes requiring off-site disposal would not impact the remaining capacity of off-site disposal facilities. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification (**WASTE-1** through **-10** and **COMPLIANCE-11** through **-13)** would apply.

C.13.7.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with Reconfigured Alternative #3.

C.13.8 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be approximately 25% smaller, occupying about 2080 acres of land (as compared with 2,740 acres required for the proposed project). The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**. The Reduced Acreage Alternative would result in an approximately 375 MW project.

This alternative is analyzed for several reasons:

- It would eliminate about 25% of the proposed project area so all impacts would be reduced;
- It would reduce impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley aeolian sand corridor, and the Mojave Fringe-Toed Lizard by prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields;
- It would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 2; and

- It would reduce impacts to primary and secondary desert washes crossing the proposed site.

C.13.8.1 SETTING AND EXISTING CONDITIONS

The Reduced Acreage Alternative would incorporate the following changes from Reconfigured Alternative #1.

It would modify the boundaries of Unit 1 as follows:

- Preclude the use of the northeastern quarter of the westernmost solar field
- It would reduce and revise the easternmost solar field to avoid the dune habitat
- It would result in approximately 803 acres or approximately 55% of the Reconfigured Alternative Unit 1 (1,467 acres)

It would modify the boundaries of Unit 2 as follows:

- Eliminate the southernmost segment of Unit 2 (170 acres within Desert Tortoise Critical Habitat)
- Eliminate the northernmost area of Unit 2 (260 acres of dune sands and MFTL habitat)
- Add 215 acres to the western end of the second and third rows of solar trough loops to make up for some of the reductions described above.

The setting for the Reduced Acreage Alternative is the same as for Reconfigured Alternative #1 with the exception of the changes addressed above.

C.13.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Reduced Acreage Alternative would generate similar types of hazardous and non-hazardous wastes from construction, operation and closure/decommissioning of the project. However, the quantities of waste would be reduced by about 25%. The amount of non-hazardous and hazardous solid wastes generated under a Reduced Acreage alternative that would require landfill/treatment over the life of the project would be approximately 48,068 cubic yards and 1,335 cubic yards, respectively. Closure/decom-missioning waste type and quantities are not identified at this time; a facility closure plan will identify waste quantities and landfills with adequate capacity. Similar to the proposed project, wastes requiring off-site disposal would not impact the remaining capacity of off-site disposal facilities. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification (**WASTE-1** through **-10** and **COMPLIANCE-11** through **-13)** would apply.

C.13.8.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Reduced Acreage Alternative.

C.13.9 NO PROJECT/NO ACTION ALTERNATIVES

C.13.9.1 NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on PSPP project application and on California Desert Conservation Area (CDCA) land use plan amendment

Under this alternative, the proposed PSPP project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no new wastes would be generated. This No Project/No Action Alternative would not result in impacts to waste management at this location. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.13.9.2 NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on PSPP project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed PSPP project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Different solar technologies would create different amounts and types of wastes based on the technology components and requirements; however, it is expected that the construction of all solar technologies at the site would generate waste. As such, impacts to waste management from the solar project would likely be similar to impacts to waste management from the proposed project. Therefore, this No Project/No Action Alternative could result in waste management impacts similar to the impacts under the proposed project.

C.13.9.3 NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on PSPP project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed PSPP project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would

be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no wastes would be generated from the construction or operation of the proposed project under this alternative. Therefore, this No Project/No Action Alternative would not result in impacts to waste management. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.13.10 PROJECT-RELATED FUTURE ACTIONS – WASTE MANAGEMENT

In order to transmit the power generated at the Palen Solar Power Project to the electricity grid, a new substation is required. Southern California Edison Company (SCE) will construct and operate the substation, which will allow the electricity to be carried by the Devers-Palo Verde No. 1 (DPV1) 500 kV transmission line.

The SCE Red Bluff Substation is a reasonably foreseeable project if the PSPP is approved and constructed as proposed. Therefore, this section examines the potential impacts of the construction and operation of the proposed substation. This substation would allow interconnection of the PSPP and other renewable projects in the Desert Center area.

The SCE Red Bluff Substation project will be fully evaluated in a future EIS prepared by the BLM. Because detailed design information is not yet available for the Red Bluff Substation, the impact analysis presented here is based on available information. The purpose of this analysis is to inform the Energy Commission and BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the PSPP.

The project components and construction activities associated with this substation are described in Section B.3 of this Revised Staff Assessment, and a map of its location is presented as **Figure B.3-1**. This analysis examines the construction and operational impacts of a 230/500 kV substation that would be located on approximately 90 acres, south of Interstate 10 and southeast of Desert Center. Substation components will include 230 kV and 500 kV lines, 230/ 500 kV transformer banks, associated switchracks, and a microwave tower. The substation would be located in an existing CDCA utility corridor, north of and adjacent to the existing DPV1 500 kV transmission line.

C.13.10.1 ENVIRONMENTAL SETTING

The Red Bluff Substation would be located on undeveloped publicly-owned desert and mountainous land with relatively few activities that could generate the hazardous wastes or contaminated areas that are of specific concern in this analysis. Specific site surveys for contamination sites would be required prior to any permitting, consistent with the discussions presented earlier in this section.

The environmental setting for the PSPP (Section C.13.4) discusses the closest landfills to the Chuckwalla Valley, Riverside County, California and their remaining capacities as well as the closest landfills that accept hazardous wastes.

Waste management activities associated with the proposed action would include the storage, transport, recycling, or disposal of all project waste streams. Waste streams generally include solid waste and liquid waste. For the purposes of this analysis, discharges to the atmosphere are not included as a waste stream. Atmospheric discharges and air quality are described in the **AIR QUALITY** section. Solid waste would include office type materials (paper, cardboard, newspaper, etc.) and any other solid material that is stored or disposed of as a non-hazardous waste. Liquid waste may include human septic waste, process fluid waste, and storm water runoff.

All waste streams are regulated and discharges or disposal of any waste material either requires specific permitting or disposal at a permitted facility under the conditions of the operator. Both solid and liquid waste streams can be either hazardous or non-hazardous, depending on the constituents in the waste stream and the characteristics (ignitability, reactivity, toxicity, and corrosivity) of the waste. The status of the waste stream determines both the storage options for the material, and the disposal method for the material.

Liquid waste disposal facilities include municipal waste water treatment plants and individual sewage disposal systems (ISDS). Municipal waste treatment plants are allowed to receive residential, commercial, and industrial human sewage material, and some regulated industrial liquid waste streams. Residential human sewage waste can also be disposed of in ISDS. Any liquid waste stream that is considered hazardous must be disposed of in a Class I landfill or through a combination of recycling and disposal at a permitted facility.

Uncontrolled solid waste disposal facilities may be present within the proposed transmission line ROW area. These facilities may include historic fill areas associated with urban solid waste disposal, areas of domestic solid waste present on private property, or areas of illegal solid waste disposal on public lands. These types of facilities may or may not be publicly known, mapped, and identified. Public records for these facilities would be reviewed as part of Phase 1 ESA completed prior to permitting of the project. Unknown areas of solid waste disposal may be encountered during project construction activities.

C.13.10.2 ENVIRONMENTAL IMPACTS

Construction would generate waste largely in the form of soil from structure/substation excavation, utility line cable, and scrap metal from the replacement of existing structures. Hazardous wastes generated during construction and operation would be recycled to the extent possible and practical. Those wastes that cannot be recycled would be transported off site to a permitted treatment, storage, or disposal facility.

Due to the number and capacity of landfills serving the project area, capacity for materials generated from construction of the SCE Red Bluff Substation would be available. Because the exact amount of material recycling is unknown, the total amount of waste

requiring landfill disposal is unknown. Recycling activities would greatly reduce the quantity of construction-related materials transported to local landfills.

As the waste generated by the substation would occur over the entire construction period and could be dispersed among the various landfills serving the entire project area, the daily waste exported off site would be a fraction of the maximum daily throughput for any of the landfills in the area. Therefore, construction waste generated by the project would not substantially affect the remaining capacities of local landfills to serve local demands.

C.13.11 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 (California Code Regulation, Title 14, section 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).

There is the potential for substantial future development in eastern Riverside County and throughout the southern California desert region. Analysis of cumulative impacts is based on data provided in the following maps and tables (see **SECTION G.4, CUMULATIVE SCENARIO**):

- Cumulative Impacts Figure 1, Regional Renewable Applications;
- Cumulative Impacts Figure 2, 1-10 Corridor Existing and Future/Foreseeable Projects;
- Cumulative Impacts Table 1A, Renewable Energy Projects in the California Desert District
- Cumulative Impacts Table 1B, Renewable Energy Projects on State and Private Lands
- Cumulative Impacts Table 2, Existing Projects along the 1-10 Corridor (Eastern Riverside County); and
- Cumulative Impacts Table 3, Future Foreseeable Projects along the 1-10 Corridor (Eastern Riverside County).

The analysis in this section first defines the geographic area over which cumulative impacts related to waste management could occur. The cumulative impact analysis itself describes the potential for cumulative impacts to occur as a result of implementation of the proposed project along with the listed local and regional projects.

Existing Cumulative Conditions

Cumulative impacts can occur within 1-10/Eastern Riverside County area if implementation of the PSPP project could combine with those of other local or regional projects. Cumulative impacts could also occur as a result of development of some of the many

proposed solar and wind development projects that have been or are expected to be under consideration by the BLM, the Energy Commission and Riverside County in the near future. Many of these projects are located within the California Desert Conservation Area, as well as on BLM land in Nevada and Arizona.

The geographic extent for the analysis of the cumulative impacts associated with the PSPP project is Riverside County, the location of the closest large Class III landfills. This geographic scope is appropriate because waste disposal facilities in Riverside County are the ones most likely to be used for disposal of waste generated by the PSPP Project considering regulatory acceptability and transport costs.

Future Foreseeable Projects

The PSPP Project would generate non-hazardous solid waste that would add to the total waste generated in Riverside County. Non-hazardous solid waste generated by all of the past, present, and reasonably foreseeable projects presented in Cumulative Impacts Table 2 and Cumulative Impacts Table 3 would also be disposed of within Riverside County. Most of the reasonably foreseeable projects identified in Cumulative Impacts Table 3 would generate smaller volumes of non-hazardous waste than the PSPP Project.

Foreseeable Projects in the Project Area

Staff used a value of 100 cubic yards/MW as a rough guide for determining total volume of non-hazardous solid wastes that could result from implementation of all the projects listed in the two tables, the majority of which are renewable energy facilities, and particularly solar facilities. The value is based on the 500-MW PSPP project total lifetime value of 64,090 cubic yards of non-hazardous solid waste, factoring in the lesser amounts of waste likely to be generated by solar photovoltaic projects. Similar to the proposed projects, these quantities do not include closure or decommissioning wastes; disposal at landfills with adequate capacity would be a condition in facility closure plans. The approximately 450,000 cubic yards generated from projects listed in Cumulative Impacts Table 3 compares to the almost 200,000,000 cubic yards of Class III landfill capacity available to these generators as indentified in AFC Table 5.16-4 (Solar Millenium 2009a, page 5.16-10, 11). Staff concludes that the non-hazardous waste generated by the PSPP Project would not result in significant adverse cumulative waste management impacts under CEQA.

As stated above, the non-recyclable component of the 1,780 cubic yards of total lifetime hazardous waste from the PSPP project would not impact the capacity or remaining life of the Class I waste facilities. Using a similar conversion factor as that noted above, staff estimated that approximately 16,000 cubic yards of lifetime hazardous waste would be generated by the projects listed in Cumulative Impacts Table 3. This compares to the almost 10,000,000 cubic yards of Class I landfill capacity available to these generators as indentified in AFC Table 5.16-4 (Solar Millennium 2009a, page 5.16-10, 11). Staff concludes that hazardous waste generated by the PSPP Project would not result in significant adverse cumulative waste management impacts under CEQA.

Foreseeable Renewable Projects in the California Desert

Implementation of the multiple solar and wind projects proposed to be developed in the California Desert, and other planned non-energy projects, would result in an increase in generation of hazardous and non-hazardous solid and liquid waste and would add to the total quantity of waste generated throughout the desert. However, project wastes would be recycled wherever practical and sufficient capacity is available throughout the area, especially with the addition of the Mesquite Regional Landfill with a capacity of 600 million tons and scheduled to be fully operational in 2011/2012 (Mesquite Regional Landfill 2010). Therefore, impacts of the PSPP project, when combined with impacts of the future solar and wind, and other development projects, currently proposed within the California desert would not result in significant adverse and unavoidable cumulative impacts, under CEQA, with regard to waste management.

Cumulative Impact Conclusion

Impacts of the PSPP project would combine with impacts of past, present, and reasonably foreseeable projects to result in a contribution to local and regional cumulative impacts related to waste management.

The amount of non-hazardous and hazardous wastes generated during construction, operation and closure/decommissioning of the PSPP project would add to the total quantity of hazardous and non-hazardous waste generated in Riverside County. However, sufficient capacity is available at treatment and disposal facilities to handle the volumes of wastes that would be generated by the project. Therefore, staff concludes that the waste generated by the PSPP project would not result in significant adverse cumulative waste management impacts, under CEQA, either locally or regionally.

C.13.12 COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed project would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The applicant is required to recycle and/or dispose of hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the proposed project would be required to obtain a hazardous waste generator identification number from U.S. EPA. The proposed project would also be required to properly store, package, and label all hazardous waste; use only approved transporters; prepare hazardous waste manifests; keep detailed records; and appropriately train employees in accordance with state and federal hazardous waste management requirements.

C.13.13 NOTEWORTHY PUBLIC BENEFITS

Staff has not identified any noteworthy public benefits associated with waste management.

C.13.14 RESPONSE TO COMMENTS

Applicant (Galati Blek 2010i): There is no applicable LORS requiring the proposed project to comply with the condition requiring a diversion plan for 50% of construction and demolition waste.	Staff concurs and removed the condition.
Applicant (Galati Blek 2010i): For HTF spills, clarify that 42 gallons (per CERCLA) is the minimum threshold for reporting requirements.	Staff modified WASTE-9 to reflect that only HTF spills of 42 gallons or more be reported.
Applicant (Galati Blek 2010i): Upon an HTF spill, increase the time from 14 days to 28 days for the project owner to provide spill results and hazard assessment to the DTSC and CPM.	Staff modified the timeframe to 28 days.
Calif. Dept. Toxic Substances Control (CDTSC2009a): AFC should identify current or historic uses of the project site that may have released hazardous wastes/substances, and any known or potentially contaminated sites within the project area. Refer to pertinent databases of regulatory agencies.	The Applicant identified potential hazardous waste releases and contaminated sites in the Phase I ESA in the AFC.
Calif. Dept. Toxic Substances Control (CDTSC2009a): AFC should identify the mechanism to initiate any investigations or remediation, and the regulatory government agency.	Addressed in Condition of Certification **WASTE-2, -3,** and **-9.**
Calif. Dept. Toxic Substances Control (CDTSC2009a): Conduct investigations, sampling, and remediation under a Workplan approved by jurisdictional agency. Summarize Phase I and II ESA results, and clearly present sampling results in a table.	Results of Phase I ESA (which does not include physical environmental samples) summarized in Section C.13.4.2. Further investigation and remediation addressed in Conditions of Certification **WASTE-1** through **-3.**
Calif. Dept. Toxic Substances Control (CDTSC2009a): Conduct investigation, sampling, and remedial actions prior to construction as necessary. Include closure, certification, or remediation approval reports in the AFC.	Addressed in Condition of Certification **WASTE-1, -2, -3,** and **-6**.
Calif. Dept. Toxic Substances Control (CDTSC2009a): Conduct investigations for presence of hazardous materials and ACMs if structures to be demolished. If identified, take proper precautions and remediation steps.	No structures to be demolished.
Calif. Dept. Toxic Substances Control (CDTSC2009a): Contaminated soil must be properly disposed; Land Disposal Restrictions may be applicable. Any imported soils should be tested for contamination.	Contaminated soil disposal addressed in Conditions of Certification **WASTE-3**, **-4**, **-7**, and **-8.**
Calif. Dept. Toxic Substances Control (CDTSC2009a): If found necessary, conduct a study to determine if there would be any releases of hazardous materials that may pose	Addressed in Conditions of Certification **WASTE-8** and **-9**.

a risk to human health or the environment.	
Calif. Dept. Toxic Substances Control (CDTSC2009a): Manage any hazardous wastes in accordance with the Calif. Hazardous Waste Control Law and Hazardous Waste Control Regulations. Obtain an EPA Identification Number if hazardous wastes are to be generated. Authorization for certain hazardous waste treatment processes or handling may require local CUPA authorization.	LORS are discussed in Section C.13.3. EPA Identification Number addressed in Condition of Certification **WASTE-5**.
Calif. Dept. Toxic Substances Control (CDTSC2009a): If soil and/groundwater contamination is suspected, cease construction/demolition in the area and implement appropriate health and safety procedures.	Addressed in Condition of Certification **WASTE-3.**
Calif. Dept. Toxic Substances Control (CDTSC2009a): If site was previously used for agricultural or livestock activities, investigate and remediate (if necessary) onsite soils and groundwater for pesticides; agricultural, chemical, and organic waste; or other related residue.	According to the Phase I ESA, there are no indications that the site was previously used for agriculture. Grazing use is not specified, but unlikely to be a major source of contamination.
Calif. Dept. Toxic Substances Control (CDTSC2009a): DTSC can provide guidance for cleanup oversight through a Voluntary Cleanup Agreement for private parties.	Comment noted.

C.13.15 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

WASTE-1 The project owner shall prepare a UXO Identification, Training and Reporting Plan to properly train all site workers in the recognition, avoidance and reporting of military waste debris and ordnance. The project owner shall submit the plan to the Compliance Project Manager (CPM) for review and approval prior to the start of construction. The project owner shall provide documentation of the plan and provide survey results to the CPM. The plan shall contain, at a minimum, the following:

- A description of the training program outline and materials, and the qualifications of the trainers; and
- Identification of available trained experts that will respond to notification of discovery of any ordnance (unexploded or not); and
- Work plan to recover and remove discovered ordnance, and complete additional field screening, possibly including geophysical surveys to investigate adjacent areas for surface, near surface or buried ordnance in all proposed land disturbance areas.

Verification: The project owner shall submit the UXO Identification, Training and Reporting Plan to the CPM for approval no less than 30 days prior to the initiation of construction activities at the site. The results of geophysical surveys shall be submitted to the CPM within 30 days of completion of the surveys.

WASTE-2 The project owner shall provide the résumé of an experienced and qualified Professional Engineer or Professional Geologist to the Compliance Project Manager (CPM) for review and approval. The résumé shall show experience in remedial investigation and feasibility studies. This Professional Engineer or Professional Geologist shall be available during site characterization (if needed), excavation, grading, and demolition activities. 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 the CPM for review and approval.

WASTE-3 If potentially contaminated soil is identified during site characterization, excavation, grading, or demolition 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 (DTSC) or Regional Water Quality Control Board (RWQCB) and the Compliance Project Manager (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 the CPM and representatives of the DTSC or RWQCB for guidance and possible oversight.

Verification: The project owner shall submit any reports filed by the Professional Engineer or Professional Geologist to the CPM within 5 days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-4 The project owner shall submit a Construction Waste Management Plan to the Compliance Project Manager (CPM) for review and approval prior to the start of construction. 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;
- a survey of structures to be demolished that identifies the types of waste to be managed; 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/reduction plans.

Verification: The project owner shall submit the Construction Waste Management Plan to the CPM for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-5 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency (U.S. EPA) 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 and notification and receipt of the number to the CPM in the next scheduled Monthly Compliance Report after receipt of the number. Submittal of the notification and issued number documentation to 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 the CPM in the next scheduled compliance report.

WASTE-6 Upon notification of any impending waste management-related enforcement action related to project site activities by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts for the project, and describe the owner's response to the impending action or if a violation has been found, how the violation will be corrected.

Verification: The project owner shall notify the CPM in writing within 10 days of receiving written notice from authorities of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the way project-related wastes are managed as a result of a finalized action against the project.

WASTE-7 The project owner shall submit the Operation Waste Management Plan to the Compliance Project Manager (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 ensure 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 the CPM for approval no fewer than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM within 20 days of notification from 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-8 The project owner shall document all releases and spills of HTF as described in Condition of Certification **WASTE-9** and report only those that are 42 gallons or more, the CERCLA reportable quantity, as required in the **SOIL AND WATER RESOURCES** section of this document. Cleanup and temporary staging of HTF-contaminated soils shall be conducted in accordance with the approved Operation Waste Management Plan required in Condition of Certification of **WASTE-7**. The project owner shall sample HTF-contaminated soil from CERCLA reportable incidents involving 42 gallons or more in accordance with the United States Environmental Protection Agency's (USEPA) current version of "Test Methods for Evaluating Solid Waste" (SW-846). Samples shall be analyzed in accordance with USEPA Method 8015 or other method to be reviewed and approved by DTSC and the CPM.

Within 28 days of an HTF spill the project owner shall provide the results of the analyses and their assessment of whether the HTF-contaminated soil is considered hazardous or non-hazardous to DTSC and the CPM for review and approval.

If DTSC, and the CPM determine the HTF-contaminated soil is considered hazardous it shall be disposed of in accordance with California Health and Safety Code (HSC) Section 25203 and procedures outlined in the approved

Operation Waste Management Plan required in Condition of Certification **WASTE-7** and reported to the CPM in accordance with Condition of Certification **WASTE-9**.

If DTSC and the CPM determine the HTF-contaminated soil is considered non-hazardous it shall be retained in the LTU and treated on-site in accordance with the Waste Discharge Requirements contained in the **SOIL AND WATER RESOURCES** section of this document.

Verification: The project owner shall submit to the Compliance Project Manager(CPM) and Department of Toxic Substances Control (DTSC) for approval the applicant's assessment of whether the HTF contaminated soil is considered hazardous or non-hazardous under state regulations. HTF-contaminated soil that exceeds the hazardous waste levels must be disposed of in accordance with California Health and Safety Code (HSC) Section 25203. HTF-contaminated soil that does not exceed the hazardous waste levels may be discharged into the land treatment unit (LTU). For discharges into the LTU, the project owner shall comply with the Waste Discharge Requirements contained in the **SOIL AND WATER RESOURCES** section of this document.

WASTE-9 The project owner shall ensure that all accidental spills or unauthorized releases of hazardous substances, hazardous materials, and hazardous waste are documented and remediated, and that wastes generated from accidental spills and unauthorized releases are properly managed and disposed of in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document management of all accidental spills and unauthorized releases of hazardous substances, hazardous materials, and hazardous wastes that occur on the project property or related linear facilities. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; how release was managed and material cleaned up; amount of contaminated soil and/or cleanup wastes generated; 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. A copy of the accidental spill or unauthorized release documentation shall be provided to the Compliance Project Manager (CPM) within 30 days of the date the release was discovered.

WASTE-10 The project owner shall ensure that all non-hazardous, non-recyclable, and non-reusable construction and operation waste are diverted to landfills other than the Desert Center Landfill and Oasis Sanitary Landfill.

Verification: The project owner shall document all project-related solid waste disposal actions to the Compliance Project Manager annually.

C.13.16 CONCLUSIONS

Consistent with the three main objectives for staff's waste management analysis (as noted in the Introduction section of this analysis), staff provides the following conclusions:

After review of the applicant's proposed waste management procedures, staff concludes that project wastes would be managed in compliance with all applicable waste management LORS. Staff notes that construction, demolition, and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled or reused to the extent feasible, and non-recyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated on site in accordance with maximum allowable accumulation times, and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. In addition, disposal of project-generated non-hazardous wastes would not adversely impact Class III landfill capacity, and disposal of project-related hazardous wastes would not adversely impact Class I landfill capacity.

However, to help ensure and facilitate ongoing project compliance with LORS and to minimize impacts on local landfills, staff proposes Conditions of Certification **WASTE-1** through **-10**. These conditions would require the project owner to:

- Ensure the project site is investigated and remediated for any unexploded ordnance that may pose a risk to construction personnel or the environment (**WASTE-1**);
- Ensure the project site is investigated and any contamination identified is remediated as necessary, with appropriate professional and regulatory agency oversight (**WASTE-2**and **-3);**
- Obtain approval for the Construction Waste Management and Operation Waste Management Plans detailing the types and volumes of wastes to be generated and how wastes will be managed, recycled, and/or disposed of after generation (**WASTE-4** and **-7**);
- Obtain a hazardous waste generator identification number from the United States Environmental Protection Agency (**WASTE-5**).
- Report any waste management-related LORS enforcement actions and how violations will be corrected (**WASTE-6**);
- Comply with Waste Discharge Requirement stipulations for treatment of HTF-contaminated soils (**WASTE-8)**.
- Ensure that all spills or releases of hazardous substances are reported and cleaned-up in accordance with all applicable federal, state, and local requirements (**WASTE-9**); and
- Ensure that non-recyclable solid waste is diverted to landfills with sufficient remaining capacity (**WASTE-10**).

Staff concludes that management of the waste generated during construction and operation of the proposed project would not result in any significant adverse impacts,

and would comply with applicable LORS, if the waste management practices and mitigation measures proposed in the PSPP project AFC and staff's proposed conditions of certification are implemented.

C.13.17 REFERENCES

AECOM 2009. Phase I Environmental Site Assessment of Proposed Solar Power Plant Site Located in Eastern Riverside County, Near Blythe, California.

AECOM2010a – AECOM Environment (tn: 55035). Data Responses, Set 1 (#1-280), dated 1/22/2010.

Cal. Code Regs. 2008 – California Environmental Quality Act (CEQA) Guidelines. Title 14, California Code of Regulations, section 15000 and the following (Cal. Code Regs., tit. 14, §15000 et seq.).

California Integrated Waste Management Board (CIWMB) 2008. Jurisdictions with Construction & Demolition (C&D) Ordinances. http://www.ciwmb.ca.gov/LGCentral/Summaries/33/JurisCnD.htm

CEC 2009t – California Energy Commission/E. Solorio (tn: 51934). CEC Staff Dialogue with DTSC Regarding HTF, dated 6/9/09. Submitted to CEC/Docket Unit on 6/11/09.

CDTSC2009a – Dept of Toxic Substances Control / G. Holmes (tn: 54242). Letter from Department of Toxic Substances Control, dated 11/18/2009.

Galati & Blek2010i- Galati & Blek LLP (tn: 56542). Applicant's Initial Comments on the SA-DEIS, dated 5/4/2010.

Mesquite Regional Landfill – 2010. http://mrlf.org/index.php?pid=5. Accessed January 28, 2010.

Solar Millenium 2009a – Solar Millenium (tn: 52939). Application for Certification Vol 1 & 2, dated 8/24/2009.

Waste Management 2009 – Kettleman Hills Facility Project Update. http://www.kettlemanhillsfacts.com/project_update.html. Accessed March 18, 2009.

C.14 - WORKER SAFETY AND FIRE PROTECTION

Testimony of Alvin Greenberg, Ph.D.

C.14.1 SUMMARY OF CONCLUSIONS

Energy Commission staff (staff) concludes that if the applicant for the proposed Palen Solar Power Project (PSPP) provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Conditions of Certification **WORKER SAFETY-1**and **-2** and fulfills the requirements of Conditions of Certification **WORKER SAFETY-3** through **-9**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant would be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

Staff has considered the position of the Riverside County Fire Department (RCFD) and all relevant information as well as past experience at other solar power plants in California and has determined that the project would cause a significant direct and cumulative impact on local fire protection services. Therefore, staff is proposing mitigation to reduce these impacts to less than significant by requiring payment to the RCFD for capital and personnel support (see proposed Conditions of Certification **WORKER SAFETY-7**).

Lastly, in order to protect workers from potential exposure to Valley Fever, staff proposes Condition of Certification **WORKER SAFETY-9** which requires enhanced dust control measures equivalent to the requirements of Rule 402 of the Kern County Air Pollution Control District (as amended Nov. 3, 2004).

C.14.2 INTRODUCTION

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this Revised Staff Assessment (RSA) is to assess the worker safety and fire protection measures proposed by the PSPP and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and

- provide adequate emergency response procedures.

C.14.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Two issues are assessed in Worker Safety and Fire Protection:

- the potential for impacts on the safety of workers during demolition, construction, and operations activities, and
- fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by the California Department of Occupational Safety and Health (Cal/OSHA) regulations. If all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal/OSHA standards.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates the local fire department capabilities and response time in each area and interviews the local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will recommend that the applicant mitigate this impact by providing increased resources to the fire department.

Staff has also established a procedure when a local fire department has identified either a significant incremental project impact to the local agency or a significant incremental cumulative impact to a local agency. Staff first conducts an initial review of the position and either agrees or disagrees with the fire department's determination that a significant impact would exist if the proposed power plant is built and operated. A process then starts whereby the project applicant can either accept the determination made by staff or refute the determination by providing a Fire Needs Assessment and a Risk Assessment. The Fire Needs Assessment would address fire response and equipment/staffing/location needs while the Risk Assessment would be used to establish that while an impact to the fire department may indeed exist, the risk (chances) of that impact occurring and causing injury or death is less than significant.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 29 U.S. Code (USC) section 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).
Title 29 Code of Federal Regulation (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 sections 1910.1 to 1910.1500.
State	
Title 8 California Code of Regulations (Cal Code Regs.) all applicable sections (Cal/OSHA regulations)	These sections require that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling.
24 Cal Code Regs. section 3, et seq.	This section incorporates the current addition of the Uniform Building Code.
Health and Safety Code section 25500, et seq.	This section presents Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	These sections require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local (or locally enforced)	
Riverside County Ordinance 457	Adopts specific building, mechanical, plumbing, and electrical codes from sources such as the California Building Standards Commission with county-specific modifications.
Riverside County Ordinance 787	Adopts the 2007 edition of the California Fire Code and portions of the 2007 edition of the California Building Code with county-specific modifications.
Riverside County Ordinance 615	Establishes requirements for the use, generation, storage and disposal of hazardous materials within the County.
Riverside County Department of Environmental Health, Hazardous Materials Releases	Adopts State requirements and guidelines to govern hazardous materials release response plans and inventories.
NFPA 850, 58, 15, and 54	These industry standards of the National Fire Protection Association (NFPA) address the storage of and safety measures for Liquefied Petroleum gases. NFPA 58 is specifically mentioned in the 2007 California Fire Code and therefore is enforceable by the local fire department.

Applicable Law	Description
Chapter 22 of the 2007 California Fire Code	This section of the CFC addresses requirement for Motor Fuel-Dispensing Facilities and Repair Garages. It has been adopted by Riverside County and will apply to the fuel depot at the site.
NFPA 30a	This is the NFPA code for Motor Fuel Dispensing Facilities and Repair Garages (2008Edition) and is the industry standard for fuel depots.

C.14.4 PROPOSED PROJECT

C.14.4.1 SETTING AND EXISTING CONDITIONS

The proposed facility would be located in Riverside County off Interstate 10 approximately 10 miles east of Desert Center, and would consist of two units producing a total output of 500 MW. Fire support services to the site would be under the jurisdiction of the Riverside County Fire Department (RCFD). The closest RCFD fire station to the project site is the Lake Tamarisk Station #49 located at 43880 Lake Tamarisk in Desert Center, about 13 miles from the project. The estimated response time is 14 minutes once dispatched. The next nearest station would be the Blythe Air Base Station #45 located about 40 miles east, with a response time of about 30 minutes once dispatched. The fire station in Indio (Terra Lago Station #87 located at 42900 Golf Center Parkway, about 59 miles west of the PSPP) would also respond if necessary, with a response time of 45 minutes once dispatched. All RCFD fire stations are staffed full-time with a minimum of three personnel per shift which include paramedics (Solar Millennium 2009a, Section 5.11.2.6 and RCFD 2010a).

The applicant has stated that designated plant personnel would be trained as a hazardous materials response team and that one or more spill response kits would be available on-site (Solar Millennium 2009a, Section 5.6.4.2). In the event of a large incident involving hazardous materials, backup support would be provided by the RCFD, which has a hazmat response unit that is capable of responding to any incident at the proposed PSPP. The RCFD hazmat unit is located in Palm Desert (about 70 miles away) and would respond within 1.5 to 2 hours (RCFD 2010a).

Worker Safety and Fire Protection Table 2
Fire and Emergency Response for the PSPP

RCFD Station	Response Time[1]	Distance to PSPP	EMS/HazMat Capability[2]
Lake Tamarisk Station #49	14 minutes	~13 miles	Y/Y
Blythe Air Base Station #45	30 minutes	~40 miles	Y/Y
Terra Lago Station #87	45 minutes	~59 miles	Y/Y

Notes:
1 - Response times are estimated from the moment of dispatch.
2 - All personnel are trained to EMT-1 level and first responder for hazardous materials incidents.
Source: E-mail communications with the RCFD (RCFD 2010a)

In addition to construction and operations worker safety issues, the potential exists for exposure to contaminated soil during site preparation. The Phase I Environmental Site Assessment conducted for this site in 2009 found no “Recognized Environmental

Conditions" per the American Society for Testing and Materials Standards (ASTM) definition. That is, there was no evidence or record of any use, spillage, or disposal of hazardous substances on the site, nor was there any other environmental concern that would require remedial action (Solar Millennium 2009a, Section 5.16.2.3). To address the unlikely possibility that soil contamination would be encountered during construction of the PSPP, proposed Conditions of Certification **WASTE-2** and **WASTE-3** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **Waste Management** for a more detailed analysis of this topic.

Another potential hazard present at this site is the likelihood of encountering unexploded ordinance (UXOs) left over from large scale military training exercises conducted along what is now the route of Interstate 10 between 1942 and 1945 and in 1964. During WW-II, the area served as part of General George S. Patton's Desert Training Center (DTC), the largest military facility in the world. As a result of these historic military maneuvers, there is a potential for unexploded ordnance (UXO) to occur at this site. Please see **Waste Management** for further discussion of this issue. With implementation of Waste-1, staff concludes that any potential impact to workers from UXO would be reduced to less than significant.

C.14.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed PSPP would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the PSPP to have well-defined policies and procedures, training, and hazard recognition and control at its facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A Safety and Health Program would be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

Workers at the PSPP would be exposed to hazards typical of construction and operation of a solar thermal electric power generating facility.

Construction Safety Orders are published at Title 8 California Code of Regulations sections 1502, et seq. These requirements are promulgated by Cal/OSHA and would be applicable to the construction phase of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (8 Cal Code Regs. §1509)
- Construction Fire Prevention Plan (8 Cal Code Regs. §1920)
- Personal Protective Equipment Program (8 Cal Code Regs. §§1514-1522)
- Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (8 Cal Code Regs. §§3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§450 to 544) would include:

- Electrical Safety Program
- Motor Vehicle and Heavy Equipment Safety Program
- Forklift Operation Program
- Excavation/Trenching Program
- Fall Protection Program
- Scaffolding/Ladder Safety Program
- Articulating Boom Platforms Program
- Crane and Material Handling Program
- Housekeeping and Material Handling and Storage Program
- Respiratory Protection Program
- Employee Exposure Monitoring Program
- Hand and Portable Power Tool Safety Program
- Hearing Conservation Program
- Back Injury Prevention Program
- Ergonomics Program
- Heat and Cold Stress Monitoring and Control Program
- Hazard Communication Program
- Lock Out/Tag Out Safety Program
- Pressure Vessel and Pipeline Safety Program
- Solar Components Safe Handling Program

The Application for Certification (AFC) includes adequate outlines of each of the above programs (Solar Millennium 2009a, Section 5.18.3.1). Prior to the start of construction of PSPP, detailed programs and plans would be provided to the California Energy Commission Compliance Project Manager (CPM) and to the RCFD pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at PSPP, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (8 Cal Code Regs. §3203)
- Fire Protection and Prevention Program (8 Cal Code Regs. §3221)
- Personal Protective Equipment Program (8 Cal Code Regs. §§3401 to 3411)
- Emergency Action Plan (8 Cal Code Regs. §3220)

In addition, the requirements under General Industry Safety Orders (8 Cal Code Regs. §§3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§450 to 544) would be applicable to the project. Written safety programs for PSPP, which the applicant would develop, would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment Program (Solar Millennium 2009a, Section 5.18.3). Prior to operation of PSPP, all detailed programs and plans would be provided to the CPM and RCFD pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. Both safety and health programs would be comprised of six more specific programs and would require major items detailed in the following paragraphs.

Injury and Illness Prevention Program

The IIPP would include the following components as presented in the AFC (Solar Millennium 2009a, Section 5.18.3.1):

- identity of person(s) with authority and responsibility for implementing the program;
- safety and health policy of the plan;
- definition of work rules and safe work practices for construction activities;
- system for ensuring that employees comply with safe and healthy work practices;
- system for facilitating employer-employee communications;
- procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- methods for correcting unhealthy/unsafe conditions in a timely manner;
- safety procedures; and
- training and instruction.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 Cal Code Regs. §3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (Solar Millennium 2009a, Section 5.18.3.2). The plan would accomplish the following:

- determine general program requirements (scope, purpose, and applicability);
- determine potential fire hazards;
- develop good housekeeping practices and proper handling and materials storage;
- determine potential ignition sources and control measures for these sources;
- determine persons responsible for equipment and system maintenance;
- locate portable and fixed fire-fighting equipment in suitable areas;
- establish and determine training and instruction requirements; and
- define recordkeeping requirements.

Staff proposes that the applicant submit a final Fire Prevention Plan to the CPM for review and approval and to the RCFD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that, due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 Cal Code Regs. §§ 3380 to 3400). The PSPP operational environment would require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and would carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

- proper use, maintenance, and storage;
- when to use the protective clothing and equipment;
- benefits and limitations; and
- when and how to replace the protective clothing and equipment.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 Cal Code Regs. §3220). The AFC contains a satisfactory outline for an emergency action plan (Solar Millennium 2009a, Section 5.18.3.2).

The outline lists plans to accomplish the following:

- establish scope, purpose, and applicability;
- identify roles and responsibilities;
- determine emergency incident response training;
- develop emergency response protocols;
- specify evacuation protocols;
- define post emergency response protocols; and
- determine notification and incident reporting.

Written Safety Program

In addition to the specific plans listed above, additional LORS called *safe work practices* apply to the project. Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading "Construction Safety and Health Program" in this Worker Safety and Fire Protection section.

Safety Training Programs

Employees would be trained in the safe work practices described in the above-referenced safety programs.

Additional Safety Issues

This solar power plant will present a unique work environment that includes a solar field located in the high desert. The solar field features thousands of mirrors that heat a heat transfer fluid (HTF) to approximately 750°F. The pipe containing the HTF will reach temperatures at the mirror focal point as high as 1100°F. Experience at existing solar generating stations shows that these mirrors break, the pipes age, and HTF can leak and catch fire from ball joints or frayed flex hoses. The area under the solar arrays must be kept free from weeds and thus herbicides will be applied as necessary. Exposure to workers via inhalation and ingestion of dusts containing herbicides poses a health risk. Finally, workers will inspect the solar array for HTF leaks and broken mirrors at least once each day by driving up and down dirt paths between the rows of mirrors and even under the mirrors. Cleaning the mirrors will also be conducted on a routine schedule. All these activities will take place year-round and especially during the summer months of peak solar power generation, when outside ambient temperatures routinely reach 115°F and above.

The applicant has indicated that workers will be adequately trained and protected, but has not included precautions against heat stress and exposure to herbicides. Therefore,

to ensure that workers are indeed protected, staff has proposed additional requirements to proposed Conditions of Certification **WORKER SAFETY-1** and **-2**. These requirements consist of the following provisions:

- A worker heat stress protection plan that implements and expands on existing Cal OSHA regulations (8 CCR 3395) requiring heat illness prevention; and
- The development and implementation of Best Management Practices (BMP) for the storage and application of herbicides used to control weeds beneath and around the solar array.

Staff believes that effective implementation of a Heat Stress Protection Plan will mitigate the potential for significant risks to workers from heat during both construction and operations. A BMP requiring proper herbicide storage and application will mitigate potential risks to workers from exposure to herbicides and reduce the chance that herbicides will contaminate either surface water or groundwater. Staff suggests that a BMP follow either the guidelines established by the U.S. Environmental Protection Agency (EPA) (EPA 1993), or more recent guidelines established by the State of California or United States Environmental Protection Agency (U.S. EPA).

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6% of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90% employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year—more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6%) between 1980 and 1993.
- Construction injuries account for 15% of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of solar power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. That this standard practice has reduced and/or eliminated hazards has been evident in the audits staff recently conducted of power plants under construction. The

federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors in four areas:

- to improve their safety and health performance;
- to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections;
- to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and
- to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term *Competent Person* is used in many OSHA and Cal/OSHA standards, documents, and directives. A Competent Person is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of solar power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- lack of posted confined space warning placards/signs;
- confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;
- confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- dangerous placement of hydraulic elevated platforms under each other;
- inappropriate placement of fire extinguishers near hotwork;

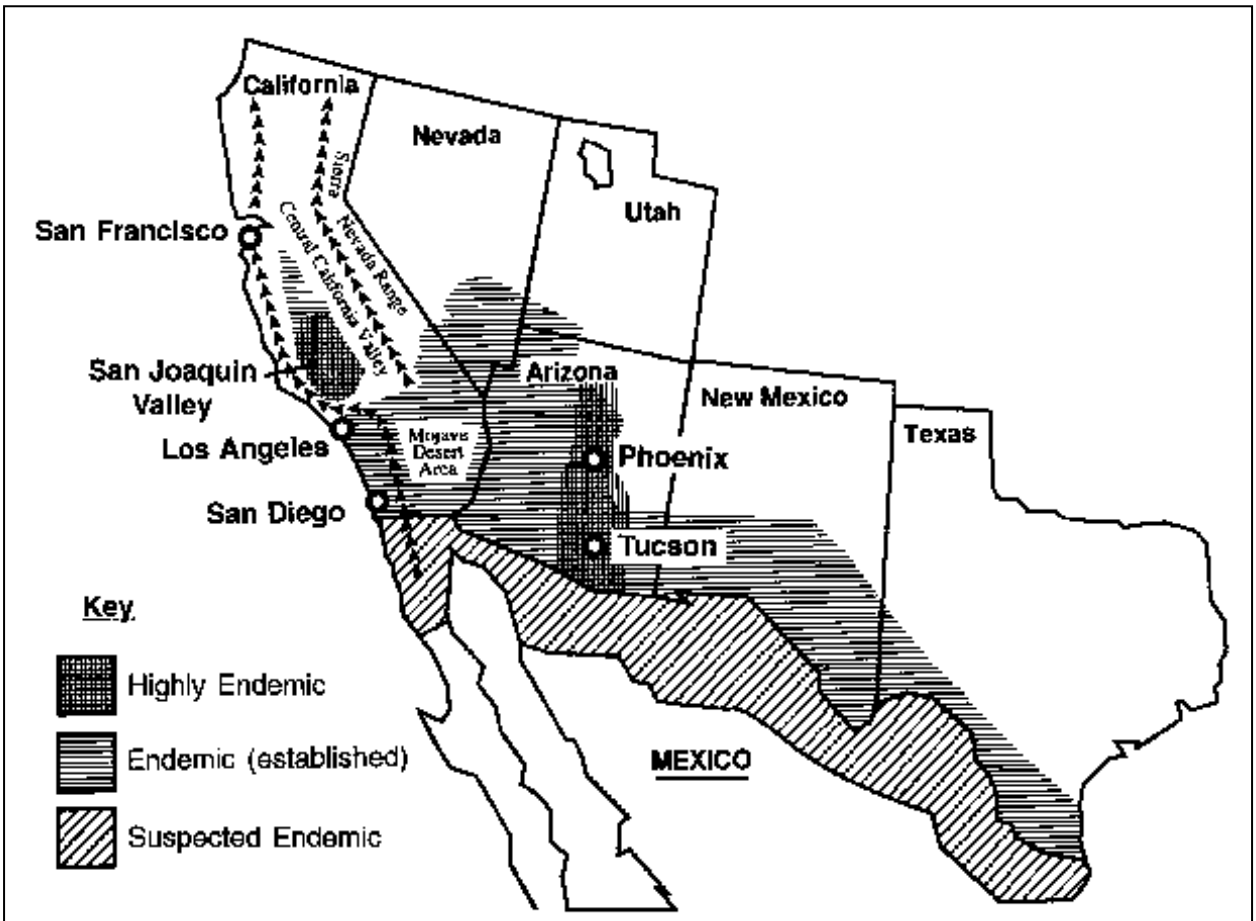
- dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;
- construction of an unsafe aqueous ammonia unloading pad;
- inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence; and
- lack of adequate employee- or contractor-written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on or off site.

In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Chief Building Official (CBO) and Compliance Project Manager (CPM), will serve as an “extra set of eyes” to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged it in questions about the team’s findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

Valley Fever (Coccidioidomycosis)

Coccidioidomycosis or "Valley Fever" (VF) is primarily encountered in southwestern states, particularly in Arizona and California. It is caused by inhaling the spores of the fungus Coccidioides immitis, which are released from the soil during soil disturbance (e.g., during construction activities) or wind erosion. The disease usually affects the lungs and can have potentially severe consequences, especially in at-risk individuals such as the elderly, pregnant women, and people with compromised immune systems. Trenching, excavation, and construction workers are often the most exposed population. Treatment usually includes rest and antifungal medications. No effective vaccine currently exists for Valley Fever. VF is endemic to the San Joaquin Valley in California, which presumably gave this disease its common name. In California, the highest VF rates are recorded in Kern, Kings, and Tulare Counties, followed by Fresno and San Luis Obispo Counties. LA County, San Diego County, San Bernardino County, and Riverside County also have reported VF cases although much fewer.

Worker Safety and Fire Protection Figure 1
Geographic Distribution of Coccidioidomycosis*



*Source: CDC 2006, Figure 2

A 2004 CDC report found that the number of reported cases of coccidioidomycosis in the US increased by 32% during 2003-2004, with the majority of these cases occurring in California and Arizona. The report attributed these increases to changes in land use, demographics, and climate in endemic areas, although certain cases might be attributable to increased physician awareness and testing (CDC 2006). According to the CDC Morbidity and Mortality Weekly Report of February 2009, incidences of valley fever have increased steadily in Arizona and California in the past decade. Cases of coccidioidomycosis averaged about 2.5 per 100,000 population annually from 1995 to 2000 and increased to 8.0 per 100,000 population between 2000 and 2006 (incident rates tripled). In 2007 there was a slight drop in cases, but the rate was still the highest it has been since 1995. The report identified Kern County as having the highest incidence rates (150.0 cases per 100,000 population), and non-Hispanic blacks having the highest hospitalization rates (7.5 per 100,000 population). In addition, between the years 2000 and 2006, the number of valley fever related hospitalizations climbed from 1.8 to 4.3 per 100,000 population (611 cases in 2000 to 1,587 cases in 2006) and then decreased to 1,368 cases in 2007 (3.6 per 100,000 population). Overall in California, during 2000-2007, a total of 752 (8.7%) of the 8,657 persons hospitalized for coccidioidomycosis died (CDC 2009).

A 2007 study published in the Emerging Infectious Diseases journal of the Center for Disease Control and Prevention (CDC), found the frequency of hospitalization for coccidioidomycosis in the entire state of California to be 3.7 per 100,000 residents per year for the period between 1997 and 2002 (see Table 1 below). There were 417 deaths from VF in California in those years, resulting in a mortality rate of 2.1 per 1 million California residents annually.

Worker Safety and Fire Protection Table 3
Hospitalizations for Coccidioidomycosis, California, 1997–2002

Category	Total Hospitalizations	Total Person-Years ($x10^6$)	Frequency of Hospitalization[1]	Frequency of Hospitalization for Coccidiodal Meningitis[1]
Year				
1997	1,269	32.5	3.90	0.706
1998	1,144	32.9	3.50	0.706
1999	1,167	33.4	3.5	0.61
2000	1,100	34.0	3.23	0.62
2001	1,291	34.7	3.7	0.58
2002	1,486	35.3	4.2	0.71
Totals	7,457	203.0	3.67	0.657
Highest-Incidence Counties				
Kern	1,700	3.97	42.8	
Tulare	479	2.21	21.7	
Kings	133	0.77	17.4	
San Luis Obispo	170	1.48	11.5	

Notes:
1 - Per 100,000 residents per year
Source: Flaherman 2007

Riverside County has approximately 50 cases of VF per year (population is roughly 2 million) while nearby San Diego County has about 120 cases per year (population roughly 3 million). In comparison, an average of over 1,000 cases have been reported annually in Kern County during the last five years. Cases of VF in Riverside County have remained steady in the past several years, fluctuating only slightly between 48 and 55 cases per year. Nine deaths related to VF have been reported in Riverside County between 2005 and 2008 (Williams 2009). A rate of 50 cases per year per 2,000,000 persons corresponds to a risk of about 25 in 1 million and a rate of 2.5 cases per 100,000 persons, which is lower than the average rate for the entire state of California (~3.6 cases per 100,000 residents). Data received from the Riverside County Department of Public Health indicates that the crude VF rate in Riverside County between 1999 and 2006 has been even lower, about 15 per 100,000 residents. The region in which the PSPP project would be located (between Blythe and Desert Center) has recorded 5 or fewer cases between 1999 and 2006 (RCDPH 2007).

Worker Safety and Fire Protection Table 4
Valley Fever Rates in Riverside County

County of Riverside Reported Cases: Coccidioidomycosis (Valley Fever) Years 1999-2006, by Zip Code of Residence[1]			
Zip Code	**PO Name**	**8-Year Total**	**8-Year Estimated Crude Aggregate Rate (per 10,000)**
92236	Coachella	5	1.7
92225	Blythe	5	2.8
92883	Corona	5	2.6
92591	Temecula	5	1.5
92201	Indio	6	1.0
92505	Riverside	6	1.4
92544	Hemet	7	1.6
92530	Lake Elsinore	7	1.4
92506	Riverside	7	1.5
92879	Corona	8	1.6
92507	Riverside	10	1.9
92583	San Jacinto	10	4.0
92570	Perris	11	2.5
92220	Banning	12	3.8
92586	Sun City	12	6.2
92509	Riverside	13	1.8
92504	Riverside	21	4.0
92503	Riverside	32	4.1
TOTAL	ALL COUNTY	280	1.5

Notes:
1 - Only zip codes for which more than 4 cases were recorded during the 8-year period are included
Source: DHS: AVSS CMR reporting
Compiled: Riverside County Department of Public Health, Epidemiology and Program Evaluation, Kevin Meconis, Epidemiologist, 11/19/2007

A 1996 paper that tried to explain the sudden increase in Coccidioidomycosis cases that began in the early 1990's found that the San Joaquin Valley in California has the largest population of C. immitis, which is found to be distributed unevenly in the soil and seems to be concentrated around animal burrows and ancient Indian burial sites. It is usually found 4 to 12 inches below the surface of the soil. The paper also reported that incidences of coccidioidomycosis vary with the seasons; with highest rates in late summer and early fall when the soil is dry and the crops are harvested. Dust storms are frequently followed by outbreaks of coccidioidomycosis (Kirkland 1996). A modeling attempt to establish the relationship between fluctuations in VF incident rates and weather conditions in Kern County found that there is only a weak connection between weather and VF cases (weather patterns correlate with up to 4% of outbreaks).

The study concluded that the factors that cause fluctuations in VF cases are not weather-related but rather biological and anthropogenic (i.e. human activities, primarily construction on previously undisturbed soil) (Talamantes 2007).

During correspondence with Dr. Michael MacLean of the Kings County Health Department, he noted that according to his experience and of those who study VF, it is very hard to find the fungus in soil that was previously farmed and irrigated, which greatly reduces the risk of infection resulting from disturbance of farmed lands. This does not apply to previously undisturbed lands where excavation, grading, and construction may correlate with increases in VF cases. Dr. MacLean feels that with the current state of knowledge, we can only speculate on the causes and trends influencing VF cases and he does not feel that construction activities are necessarily the cause of VF outbreaks (KCEHS 2009).

Valley Fever is spread through the air. If soil containing the fungus is disturbed by construction, natural disasters, or wind, the fungal spores get into the air where people can breathe in the spores. The disease is not spread from person to person. Occupational or recreational exposure to dust is an important consideration. Agricultural workers, construction workers, or others (such as archeologists) who dig in the soil in the disease-endemic area of the Central Valley are at the highest risk for the disease (CDC 2006; CDHS 2010). The risk for disseminated coccidioidomycosis is much higher among some ethnic groups, particularly African-Americans and Filipinos. In these ethnic groups, the risk for disseminated coccidioidomycosis is tenfold that of the general population (CDC 2006).

Worker Safety and Fire Protection Table 5
Disease Forms of Valley Fever

Categories	Notes
Asymptomatic	• Occurs in about 50% of patients
Acute Symptomatic	• Pulmonary syndrome that combines cough, chest pain, shortness of breath, fever, and fatigue. • Diffuse pneumonia affects immunosuppressed individuals • Skin manifestations include fine papular rash, erythema nodosum, and erythema multiforme • Occasional migratory arthralgias and fever
Chronic Pulmonary	• Affects between 5 to 10% of infected individuals • Usually presents as pulmonary nodules or peripheral thin-walled cavities
Extrapulmonary/Disseminated Varieties	
Chronic skin disease	• Keratotic and verrucose ulcers or subcutaneous fluctuant abscesses
Joints / Bones	• Severe synovitis and effusion that may affect knees, wrists, feet, ankles, and/or pelvis • Lytic lesions commonly affecting the axial skeleton
Meningeal Disease	• The most feared complication • Presenting with classic meningeal symptoms and signs • Hydrocephalus is a frequent complication
Others	• May affect virtually any organ, including thyroid, GI tract, adrenal glands, genitourinary tract, pericardium, peritoneum

Given the available scientific and medical literature on Valley Fever, it is difficult for staff to assess the potential for VF to impact workers during construction and operation of the proposed PSPP with a reasonable degree of certainty. To minimize potential exposure of workers and also the public to coccidioidomycosis during soil excavation and grading, extensive wetting of the soil prior to and during construction activities should be employed and dust masks should be worn at certain times during these activities. The dust (PM10) control measures found in the Air Quality section of the SA/RSA should be strictly adhered to in order to adequately reduce the risk of contracting VF to less than significant. Towards that, staff proposes Condition of Certification **WORKER SAFETY-9** which would require that the dust control measures found in proposed Conditions **AQ-SC3** and **AQ-SC4** be supplemented with additional requirements including implementing methods equivalent to the requirements of Rule 402 of the Kern County Air Pollution Control District (as amended Nov. 3, 2004).

Fire Hazards

During construction and operation of the proposed PSPP project, there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, hydraulic fluid, mineral oil, insulating fluid at the power plant switchyard or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Fires of heat transfer fluid such as that proposed for use in the solar panels at PSPP are rare, yet those that have occurred have been extremely large, have lasted a very long time, have proved to be difficult to extinguish, and have resulted

in the depletion, draw-down, and exhaustion of regional fire suppression resources involving several agencies. Compliance with all LORS and providing mitigation to the RCFD would be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the RCFD to determine if available fire protection services and equipment would adequately protect workers and to determine the project's impact on fire protection services in the area. The project will rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the RCFD (RCFD 2010a).

Construction

During construction, the permanent fire protection systems proposed for the PSPP would be installed as soon as practical; until then portable fire extinguishers would be placed throughout the site at appropriate intervals and periodically maintained. Safety procedures and training would be implemented according to the guidelines of the Construction Fire Protection and Prevention Plan (Solar Millennium 2009a, Section 5.18.3.1).

The applicant has also indicated that it intends to construct and operate a concrete batch plant and an above-ground fuel depot on the site during construction. The fuel depot (which may remain in service during operations) will contain a maximum of 20,000 gallons of diesel fuel and 500 gallons of gasoline (Galati & Blek2010i, Revised Project Description).The concrete batch plant will be required to have additional fire detection and suppression systems that will be reviewed and evaluated by the Riverside County Fire Marshall and the Energy Commission CPM.

The fire protection measures that are required by code for the fuel depot and dispensing facility include:

- Chapter 22 of the 2007 California Fire Code: Motor Fuel-Dispensing Facilities and Repair Garages (formally adopted by Riverside County)
- NFPA 30a: Code for Motor Fuel Dispensing Facilities and Repair Garages (2008Edition)

Applicable sections of the 2007 Ca Fire Code and NFPA 30a are very similar; however NFPA 30a contains more details for fuel tank design specifications and other requirements. The requirements listed in these codes include the materials to be used to construct fuel tanks, location of dispensing devices, spacing from other structures, fencing, physical protective barriers, shut-off valves, emergency relief venting, secondary containment, vapor and liquid detection systems with alarms, and other general design requirements.

NFPA 30a requires the following:

- 7.3.5 Fixed Fire Protection.

- 7.3.5.1 For an unattended, self-serve, motor fuel dispensing facility, additional fire protection shall be provided where required by the *authority having jurisdiction.(italics added)*
- 7.3.5.2 Where required, an automatic fire suppression system shall be installed in accordance with the appropriate NFPA standard, manufacturers' instructions, and the listing requirements of the systems.
- 9.2.5 Basic Fire Control.
- 9.2.5.1 Sources of Ignition. Smoking materials, including matches and lighters, shall not be used within 6m (20 ft) of areas used for fueling, servicing fuel systems…
- 9.2.5.2 Fire Extinguishers. Each motor fuel dispensing facility or repair garage shall be provided with fire extinguishers installed, inspected, and maintained as required by NFPA 10, *Standard for Portable Fire Extinguishers.* Extinguishers for outside motor fuel dispending areas shall be provided according to the extra (high) hazard requirements for Class B hazards, except that the maximum travel distance to an 80 B:C extinguisher shall be permitted to be 30.48m (100 feet).
- 9.2.5.3 Fire Suppression Systems. Where required, automatic fire suppression systems shall be installed in accordance with appropriate NFPA standard, manufacturer's instructions, and the listing requirements of the systems.

The authority having jurisdiction is the Energy Commission and the RCFD which will review and comment on the fire detection and suppression plans for the fuel depot before it is built and operated.

The only fire protection measure explicitly listed in the CA Fire Code is a requirement for fire extinguishers to be located within 75 feet of the fuel dispensing equipment. Neither the CFC nor the Riverside County codes require sprinkler systems for fuel dispensing facilities. Section 2203.2 of the CFC requires an approved, clearly identified and readily accessible emergency disconnect switch at an approved location to stop the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. Section 2205.3 requires spill control to prevent liquids spilled during dispensing operations from flowing into buildings and section 2206.5 requires that above-ground tanks be provided with secondary containment in the form of drainage control or placement of berms or dikes in accordance with Chapter 34. The applicant has proposed to install secondary containment.

Staff has assessed the proposed concrete batch plant and fuel depot and has determined that the applicant intends to meet all codes and standards in their operations of the batch plant and fuel depot. Proposed Condition of Certification Worker Safety-1 would require the RCFD to review and the CPM to review and approve the fire protection systems for the fuel depot.

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the 2007 California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements, with the exception of providing a secondary access road and gate for emergency response vehicles. The proposed PSPP has only one access point, that being through the main gate (via a new paved access road from an I-10 interchange), and the AFC makes no mention of a secondary access road to the site or another access gate through the perimeter fence (Solar Millennium 2009a, Section 2.5.6.5). Both the California Fire Code (24 CCR Part 9, chapter 5, section 503.1.2) and the Uniform Fire Code (sections 901 and 902) require that access to the site be reviewed and approved by the fire department, and the RCFD stated that a second road and gate for fire and emergency responders is required for this site (RCFD 2010b).

Staff concludes that a second access road and access gate is necessary to ensure fire department and other emergency response access should the main road or main gate be blocked. Additionally, the fire department may wish to suppress a fire from multiple sides and access to another part of the site would be needed. The second access road and gate shall be restricted to emergency use only. Therefore, in order to comply with the requirements of LORS, staff proposes a Condition of Certification **WORKER SAFETY-6** that would require the project owner to provide a second access road to the site for emergency vehicles, at least one other gate into the site, and equip the gate with either a keypad or key for fire department and other emergency response personnel to open the gate. This second road shall be at a minimum an all-weather gravel road, at least 20 feet wide, and shall come from the I-10 right-of-way to the project site at the location of where the fence line of the eastern solar field comes the nearest to the I-10 right-of-way. A locked gate shall be placed in the I-10 right-of-way fence. The RCFD, the California Highway Patrol, and the Riverside County Sheriff's Department shall be given access to the I-10 fence gate and the gate into the project site.

Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The fire water would be supplied from up to ten on-site wells and stored in two 1,000,000-gallon water storage tanks (one at each unit) with a dedicated fire protection supply of 360,000 gallons in each. One electric and one diesel-fueled backup firewater pump would ensure water supply to each fire protection loop and an electric jockey pump would maintain pressure in the systems (Solar Millennium 2009a, Section 5.18.3.2).

Fire hydrants would be installed throughout the site per NFPA requirements and a sprinkler deluge system would be installed in areas of risk including each unit's transformer, HTF expansion tank, and HTF circulating pump area. A sprinkler system would be installed at the steam turbine generators (STGs) and in administrative buildings. In addition to the fixed fire protection system, appropriate class of service portable extinguishers and fire hydrants/hose stations would be located throughout the facility at code-approved intervals. The solar fields would be protected by isolation valves that would allow only a finite amount of HTF to burn before extinguishing. HTF

piping within the power block would also be equipped with isolation valves and a foam fire-fighting truck would be provided on-site to suppress and extinguish HTF fires (Solar Millennium 2009a, Section 5.18.3.2).

According to NFPA standards and Uniform Fire Code (UFC) requirements, the fire protection system must have fire detection sensors and monitoring equipment that would trigger alarms and automatically actuate the suppression systems. Staff has determined that these systems will ensure adequate fire protection.

The applicant would be required by Conditions of Certification **WORKER SAFETY-1** and**-2** to provide the final Fire Protection and Prevention Program to staff and to the RCFD prior to construction and operation of the project to confirm the adequacy of the proposed fire protection measures.

In two letters from the RCFD (RCFD 2010a and 2010b), Captain Neuman of the RCFD has stated that the PSPP would have an impact on Riverside County Fire Department's ability to respond to fire, Hazardous Materials (HazMat), and Emergency medical Services (EMS) emergencies at the PSPP. He also stated that the three solar projects proposed for the I-10 corridor (Blythe, Genesis, and Palen) plus the proposed Rice solar project would also have a cumulative adverse impact on the RCFD's ability to provide an acceptable level of service. The RCFD based its analysis on their categories of industrial facilities, the type and level of service needed for projects in each category, the appropriate response times needed for each category, and the level of response required for the PSPP. The RCFD determined that, due to the remote location of the PSPP and the other two solar power plants and the expansive nature of solar arrays at the PSPP, as well as the huge volume of combustible (flammable at the elevated operating temperatures) HTF and flammable/explosive propane, the response time from the RCFD's existing facilities would be inadequate and that a new fire station more closely located to these solar power plants and adequately equipped and staffed would be necessary.

Staff has considered the position of the RCFD and all relevant information as well as past experience at existing solar power plants that are similar to the proposed project. The proposed facility would be located in an area that is currently served by the RCFD. The fire, HazMat, rescue, inspection, and EMS needs at the proposed plant are real and would pose significant added demands on local fire protection services. In addition, staff concludes that the RCFD's Hazmat Response Team is not adequately equipped and staffed to respond to hazardous materials incidents at the proposed facility with an adequate response time. Staff concurs with the assessment of the RCFD and has determined that the PSPP would cause a significant direct and cumulative impact on the local fire department.

Regarding potential mitigation, Captain Neuman stated that in general the impacts could be mitigated at least in part to a level of insignificance if the developers of all four proposed solar projects participate in the "Development Impact Fee Program" adopted by the Riverside County Board of Supervisors. In two personal communications via telephone (February 10, 2010), staff discussed these impacts and the potential for

mitigation with Captain Neuman and Mr. Ross of the Riverside County Planning Department. It appears that this solar power plant located on Federal BLM land would not be required to participate in the County's fee program.

Since the publication of the Supplemental Staff Assessment, staff has continued to review the emergency response needs of the proposed solar power plants which would be located in Riverside, Imperial, San Bernardino, and Kern Counties. Staff has also met with and/or spoken with the fire departments of Riverside County, Imperial County, San Bernardino County, and Kern County. Staff now has a much better understanding of the impacts to these rural county fire departments posed by the proposed solar power projects.

Staff also reviewed the records of emergency responses of the San Bernardino County Fire Department (SBCFD) to the only three thermal solar power plants in the state. These are the Solar Electric Generating Station (SEGS) 1 & 2 (43.8 MW) in Daggett (operating since 1984), SEGS 3-7 (150 MW) at Kramer Junction (1989), and SEGS 8 & 9 (160 MW) at Harper Dry Lake (1989). Staff offers this background information as a basis to support staff's contention that no matter where the solar plant is located, the local fire department having jurisdiction will have to provide some level of services in five areas of response:

1. Plan reviews, inspections, and permitting
2. Fire response
3. Hazmat spill response
4. Rescue
5. Emergency Medical Services (EMS)

In summary, staff found that including emergency response for fire, rescue, medical and hazardous materials incidents, approximately 30 incidents occurred since 1998 that required the SBCFD (and other fire stations through mutual aid agreements) to respond to the three solar power plant sites. These included fires, fire alarm activations, injuries, medical emergencies, hazardous materials spills, complaints/calls from the public, and false alarms. However, the available records did not include documentation of a major fire at the SEGS 8 facility (80 MW) in January of 1990 that required a large part of the regional resources from four different fire districts including the San Bernardino County, Edwards Air Force Base, California Department of Forestry (now Cal Fire), and the Kern County fire departments. This fire is the largest incident that has occurred at a solar thermal plant in California and demonstrates the magnitude of fire department resources that can be required to respond to a fire at a large thermal solar facility. The inability to quickly control this event had ramifications for the project's finances and reliability - it took almost two years to bring the SEGS 8 heaters back on-line and supplement the solar field generation – and resulted in a "draw-down" of emergency response resources in the northern part of San Bernardino County. A "draw-down" is when emergency response teams vacate an area to respond to an emergency, thus leaving that area without adequate fire and other emergency response services. This represents a very serious situation where the population and infrastructure is left vulnerable.

The proposed PSPP is very different from the industrial, commercial, and residential development currently found in the Riverside County desert region. It is also different from the existing solar plants located at Harper Lake and Kramer Junction in San Bernardino County. The Palen solar power plant would be larger in scale than the existing solar power plants and will have a huge amount of highly combustible heat transfer fluid in use at elevated pressure and temperature that will render this fluid flammable at its normal operating temperature of 750°F. The PSPP will also store large amounts of propane or other Liquefied Petroleum Gas at both power blocks that present a risk of explosion and fire. An unconfined vapor cloud explosion of accidentally released propane or a BLEVE (Boiling Liquid Expanding Vapor Explosion) of a propane tank would no doubt destroy part of the nearby solar arrays, damage valves, and render the command and control system inoperable, thus resulting in a widespread HTF fire. The amount of flammable, combustible, and/or explosive materials stored/used on-site, combined with the potential for escalation of a small fire into a large conflagration enveloping the entire site and perhaps even beyond presents an emergency response challenge for the RCFD. The proximity of residences to the northern fence line and of I-10 to the southern fence line would place the off-site public in danger. Although the applicant has demonstrated through modeling that a blast effect or HTF fire would not impact travelers on I-10 directly, staff believes that a major explosion or fire in the solar arrays or propane tank near the freeway would cause the California Highway patrol to close-down I-10 until the RCFD could control the blaze.

Presently, the RCFD is not able to respond to fire, hazmat, rescue, and EMS emergencies in a timely manner at the PSPP. The standard fire department response for a fire or for a hazmat spill includes response of six engines and at least three fire fighters on each engine. To fight a fire inside a structure, the RCFD must adhere to standard operating procedures and Cal-OSHA regulations that require “two in, two out”. Thus, a response of three fire fighters from one station would not allow fire fighters to attack a fire from within a structure or conduct a rescue. Confined space and collapsed trench rescues would also be problematic with only three fire fighters. Therefore, no matter what size the fire or how many workers are initially in need of rescue, the RCFD would dispatch engines from at least three fire stations so that at a minimum, nine firefighters are sent to the scene but the RCFD could eventually dispatch a total of 9 engines. Even if mutual aid was available and an “automatic aid” pact was in effect, the RCFD would still have to respond to an emergency at the PSPP site because it is the Authority Having Jurisdiction.

Additionally, it is very important to note that the PSPP will be located in an extremely harsh desert environment. The ability of a fire fighter to perform duties while wearing a turn-out coat, heavy boots, and a respirator (self contained breathing apparatus) is limited under the best of circumstances. If conducting a rescue or fighting a fire that necessitates use of a respirator, the high-temperatures of the desert, often exceed 115° F, severely limits a fire fighter’s ability to perform the duties to 15 minutes at a time. This severe time restriction necessitates the mobilization of more fire fighters to respond to the emergency.

Staff has considered the position of the RCFD and all relevant information as well as past experience at existing solar power plants that are similar to the proposed project. The proposed facility would be located in an area that is currently served by the RCFD.

The inspection, fire, hazmat, rescue, and EMS needs at the proposed PSPP are real and would pose significant added demands on local fire protection services. Staff has determined that the PSPP would cause a significant direct and cumulative impact on public health and safety by placing a serious strain on the available fire protection resources such that if a response were necessary, regional depletion of emergency fire response resources would occur (referred to as "draw-down") and the surrounding communities would be left without proper protection from the local fire department.

Staff has also developed an Emergency Response Matrix that staff, the fire departments, and project owners may use to assess the level of emergency response need (CEC 2010k). This analytical tool has a weighting scheme for the various categories of fire department response and utilizes professional judgment in the assignment of the "score" to the categories. Staff has tested this methodology on existing and planned solar power plants and concludes it to be useful but cautions against using it as the sole basis for determining need or for allocating financial responsibility for direct individual or cumulative impacts. Otherwise, staff recommends that the applicant prepare an independent fire needs assessment and a fire risk assessment for the Palen project to better assess impacts on emergency response services in the jurisdictions.

Staff has reviewed the level of mitigation presented by the RCFD and concludes the costs to be reasonable and consistent with the costs per square foot for building a fire station, for a new fire engine, and for fire fighter salaries and benefits. In regards to the allocation of costs between the four thermal solar power plants proposed at this time in Riverside County and particularly the three along the I-10 corridor, staff found that allocating 1/4 of the total costs of locating and staffing a new fire station was reasonable and fair. Staff contends that the proximity of the PSPP to I-10 along with the presence of large volumes of heat transfer fluid and propane resulted in the increased score for this project. [note: The extreme remoteness of Genesis and Rice projects and the difficulty of emergency response crews arriving at those project sites in a timely manner also support the need for new emergency response resources for those locations.] Staff also bases its determination, in part, on its professional experience and judgment.

Therefore, staff is proposing Condition of Certification **WORKER SAFETY- 7** that requires the PSPP to either negotiate a mitigation fee agreement with the RCFD or fund fire department capital improvements in the amount of $850,000 and to make an annual payment of $375,000 to mitigate both its individual impact on the fire department and its share of a cumulative impact on the fire department. Staff is proposing that the other three solar projects proposed for Riverside County make the same payments.

Alternatively, staff suggests that the PSPP form and join a solar industry group or association that will provide membership to all solar power plants located within the jurisdiction of the RCFD or even across the greater California desert region to negotiate payment for their project-related shares of capital and operating costs to build and operate new fire protection/response infrastructure for these large, remote industrial facilities The group could ensure appropriate equipment and personnel as mitigation of project-related impacts on fire protection services on the most cost-effective basis. Staff proposes that the project owner be given this option to form and join a power generation industry association or group so that this association or group could negotiate payment

for their project-related shares of RCFD capital and operating costs. The association would be able to raise funds, negotiate payment for emergency response services with the RCFD, and audit county and district fire department protection/emergency response expenditures to ensure that funds go towards associated emergency response needs. And, most importantly, develop and implement an appropriate fee structure for its members based on project characteristics (e.g., size, technology, chemical usage, or project location relative to emergency response infrastructure) and the re-payment of funds provided by its initial members upon the joining of new members. Staff urges the applicant and the Committee to consider this approach.

Liquefied Petroleum Gas (LPG)

LPG (or propane) would be used at the proposed PSPP to fuel the auxiliary boilers and HTF heaters. LPG is composed mostly of propane and butane and poses a fire and/or possible explosion risk because of its flammability. Up to 36,000 gallons (76,000 lbs) of LPG would be stored in two 18,000-gallon carbon steel tanks equipped with secondary containment structures. The applicant stated that despite the large amounts of LPG (propane) stored at the PSPP, a Risk Management Plan (RMP) including an Off Site Consequence Analysis (OCA) is not required due to its use as a fuel (Solar Millennium 2009a, Section 5.6.3.3).

Even though an OCA is not required by regulation, the applicant modeled the worst-case accidental release scenario of propane from the proposed project. The worst-case release involves the complete failure of one of the 18,000-gallon LPG storage tanks, resulting in two scenarios: 1) a vapor cloud explosion causing a blast wave that can damage structures and cause injuries, and 2) a boiling liquid expanding vapor explosion (BLEVE) which results in thermal exposure that can cause skin injuries. The applicant stated that the two LPG tanks would be about 1.4 miles (7392 feet) apart and therefore there is no feasible scenario in which both tanks would simultaneously rupture. The modeling was conducted using EPA's RMP Offsite Consequence Analysis Guidance. Tables 5.6-4 and 5.6-5 provide the assumptions and parameters used in the modeling of each scenario (Solar Millennium 2009a).

The applicant's modeling results for the two worst-case scenarios show that blast effects would extend 1640 feet (500 meters) from the point of origin while thermal exposure would extend 1902 feet (580 meters) (Solar Millennium 2009a, Table 5.6-6). The LPG tanks are proposed to be located over 3280 feet (1000 meters) from the nearest fenceline and thus according to the applicant's modeling, impacts of the worst-case scenarios would not extend off-site (Solar Millennium 2009a, Section 5.6.3.3). This modeling was repeated for the revised configuration where the eastern solar field (Field 1) would be relocated 2700 south and closer to I-10 (AECOM2010i). The results show that no blast over-pressure or radiated heat from a propane tank fire will impact travelers on the I-10 corridor.

Staff also evaluated the potential for a fire or explosion of the propane/LPG tank to impact or damage the PSPP and off-site receptors. Staff also assessed the need for additional protective measures such as a water spray system to reduce the chances that a fire at the LPG tank would result in a further spread to the HTF system or in an explosion. In this manner, mitigation would serve to protect critical power plant components from a fire or explosion of LPG. Staff reviewed several models that agencies and the private

sector use to assess the potential for explosions of pressurized liquid petroleum gas cylinders to impact structures and people. Staff relied on methodology published by the U.S. Department of Commerce National Institute of Standards and Technology (NIST 2000) to assess the thermal radiation impacts and the model from the U.S. Department of Housing and Urban Development (HUD) standard (49 CFR 51.200 et seq.) to determine an Acceptable Separation Distance from an explosion. Both NIST and HUD utilize an acceptable thermal radiation exposure level of 31.5 kilowatts per square meter (kW/m^2) (10,000British thermal units per hour per square foot - $Btu/h/f^2$) for structures and 1.4 kW/m^2 (450 $Btu/h/ft^2$) for people. HUD uses an overpressure of 0.5 pounds per square inch (psi) as criteria for impacts from an explosion. The structures protected by this standard are assumed to be wood and thus this standard affords a large safety margin for sturdier power plant equipment.

To assess the risk of a propane/LPG explosion, staff utilized the HUD procedure that specifically assessed as an example a propane tank fire. Based on the volume of a propane tank and using Figure 1 from the HUD standard, staff determined that the minimum acceptable separation distance for structures and people would be 400 feet for an 18,000 gallon propane or LPG tank. And, thermal effects on people would be significant up to ~950 feet distant. Since the distance from the LPG tanks to the nearest power plant structures are well within the 400-foot range, and workers would be located within 950 feet, staff believes that a fire at the LPG tank presents a significant risk to critical power plant components and to workers.

Given this analysis that shows a potential for significant damage to power plant structures and injury to workers should a fire or explosion occur, staff conducted a further assessment of the factors staff considers in proposing mitigation requirements for propane or LPG storage facilities:

1. Code requirements for mitigation and type of mitigation.
2. Proximity of off-site receptors.
3. Adequacy of the local fire and emergency services (numbers and capability).
4. Response time of local fire and emergency services.
5. Worker safety.
6. Triggering of DHS Top-screen analysis.
7. Likelihood of a BLEVE occurring.
8. Likelihood of on-site fire escalation due to a fire or BLEVE.
9. Likelihood of off-site consequences from a BLEVE.
10. Power Generation Infrastructure protection.

In considering these factors for the PSPP site, staff has determined that Factors 1, 3, 4, 5, 6, 8, and 10 apply and that a water spray system would be appropriate and adequate mitigation. However, while there are no code requirements in the United States for a water spray system to cool an LPG vessel (there is such a requirement in the U.K.), the safety of LPG tanks is addressed in California Fire Code section 3804 which requires compliance with NFPA 58, the *Liquefied Petroleum Gas Code*. Section 6.25 of NFPA 58

also does not require a water spray system but if one is installed, the system shall comply with NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*. It requires that where water spray fixed systems are used, they shall be automatically actuated by fire responsive devices and by manual actuation. Other NFPA codes that address LPG tank safety include NFPA 850A and NFPA 54.

As discussed above, the Riverside County Fire Department will be impacted by the operation of this solar project and cumulatively by the operation of two additional solar projects in the I-10 corridor. Response times for HazMat and fire emergencies at the PSPP would be significant until mitigation is supplied and even then, the response time would remain far greater than if the project were located in an urban environment. Worker safety is an issue as an LPG fire or a HTF fire that threatens the LPG tank would pose a significant risk of both thermal radiation exposure to workers and of blast effects. A water spray system over the tanks would provide more time for notification and safe evacuation of employees. The amount of LPG stored on-site is above the threshold quantity for the U.S. Department of Homeland Security regulations on chemical storage (see the staff assessment section on **Site Security** in the **Hazardous Materials Management** section of this Revised Staff Assessment a more detailed analysis of this topic) and thus would trigger a "Top-Screen" analysis and requirements for security measures. While staff has not quantitatively assessed the likelihood of a BLEVE (boiling liquid expanding vapor explosion), staff believes that although it may be a low probability event, the consequences are very high. Additionally, the likelihood of an escalation of an LPG fire or BLEVE to cause fires in the remainder of the solar power plant is also very high, due to the amount (2,600,000 gal) of highly combustible (and flammable at the operating temperature of 750 °F) HTF present on-site. Finally, the investment and reliance on renewable power in California's power infrastructure requires that a high level of engineering and administrative controls be implemented to protect power generation. Given all these considerations, staff believes that a simple and effective method of cooling the LPG tanks should a fire occur is required. Staff therefore proposes Condition of Certification **WORKER SAFETY-8** which would require the placement of a water spray system above each LPG tank.

Emergency Medical Services Response

Staff conducted a statewide survey to determine the frequency of Emergency Medical Services (EMS) response for natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff concluded that incidents at gas-fired power plants that require EMS response are infrequent and represent an insignificant impact on the local fire departments, except for instances where response times are high or a rural fire department has mostly volunteer fire-fighting staff. However, staff has determined that the potential for both work-related and non-work-related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work-related incidences, including those involving visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site automatic external defibrillator (AED); the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the

basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device and the trained staff on site in order to treat cardiac arrhythmias resulting from industrial accidents or other non-work related causes.

Staff proposes Condition of Certification **WORKER SAFETY-5,** which would require that a portable AED be located on site, that all power plant employees on site during operations be trained in its use, and that a representative number of workers on site during construction and commissioning also be trained in its use.

Closure and Decommissioning Impacts and Mitigation

Closure of the proposed PSPP (temporary or permanent) would follow a facility closure plan prepared by the applicant and designed to minimize public health and environmental impacts. Decommissioning procedures would be consistent with all applicable LORS (Solar Millennium 2009a, Section 5.6.3.4). Staff expects that impacts from the closure and decommissioning process would represent a fraction of the impacts associated with the construction or operation of the proposed PSPP. Therefore based on staff's analysis for the construction and operation phases of this project, staff concludes that worker safety and fire protection-related impacts from closure and decommissioning of the PSPP would be insignificant.

C.14.4.3 CEQA LEVEL OF SIGNIFICANCE

Staff's analysis of Worker Safety and Fire Protection impacts from the proposed PSPP has determined that impacts would be below the level of significance if the proposed mitigation is implemented.

C.14.5 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

This alternative is analyzed because

1. It would retain the 500 MW generation capacity defined for the proposed project and the engineering is defined by Solar Millennium as feasible;

2. It reduces impacts to the primary and secondary desert washes that cross the proposed site; and

3. It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

C.14.5.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured

eastern solar field would be outside of the Solar Millennium Palen ROW application area but the alternative would remain entirely within BLM managed lands.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. The setting for Unit 2 would be similar to that for the proposed project.

C.14.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction and operation of the Reconfigured Alternative would have similar impacts to those analyzed for the PSPP as proposed since only the location of equipment and facilities would be altered. Staff concludes that with respect to Worker Safety and Fire Protection, the Reconfigured Alternative is not preferable over the project as proposed.

C.14.5.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Worker Safety and Fire Protection would not change with the Reconfigured Alternative, as both the project as proposed and the Reconfigured Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Reconfigured Alternative and the project as proposed.

C.14.6 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be approximately 25% smaller, occupying about 2080 acres of land (as compared with 2,740 acres required for the proposed project). The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**. The Reduce Acreage Alternative would result in an approximately 375 MW project.

This alternative is analyzed for several reasons:

1. It would eliminate about 25% of the proposed project area so all impacts would be reduced;
2. It would reduce impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley aeolian sand corridor, and the Mojave Fringe-Toed Lizard (MFTL) by prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields;
3. It would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 2; and
4. It would reduce impacts to primary and secondary desert washes crossing the proposed site.

C.14.6.1 SETTING AND EXISTING CONDITIONS

The Reduced Acreage Alternative would incorporate the following changes from the Reconfiguration Alternative:

- It would modify the boundaries of Unit 1 as follows:
- Preclude the use of the northeastern quarter of the westernmost solar field
- It would reduce and revise the easternmost solar field to avoid the dune habitat
- It would result in approximately 803 acres or approximately 55% of the Reconfigured Alternative Unit 1 (1,467 acres)
- It would modify the boundaries of Unit 2 as follows:
- Eliminate the southernmost segment of Unit 2 (170 acres within Desert Tortoise Critical Habitat)
- Eliminate the northernmost area of Unit 2 (260 acres of dune sands and MFTL habitat)
- Add 215 acres to the western end of the second and third rows of solar trough loops to make up for some of the reductions described above.

As such, the setting for the Reduced Acreage Alternative is the same as for the Reconfigured Alternative with the exception of the changes addressed above.

C.14.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction of the Reduced Acreage Alternative is likely to require fewer employees which would reduce the impacts to worker safety. Similarly, this alternative may have reduced impacts in the area of fire protection due to the smaller amounts of flammable/ hazardous materials and potential ignition sources that would exist with this alternative. However, the reduced impacts in the area of Worker Safety and Fire Protection would be minor, and staff has determined that the project as proposed would have less than significant impacts in the area of Worker Safety and Fire Protection. Therefore the Reduced Acreage Alternative is not preferable over the project as proposed.

C.14.6.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Worker Safety and Fire Protection would not change with the Reduced Acreage Alternative, as both the project as proposed and the Reduced Acreage Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Reduced Acreage Alternative and the project as proposed.

C.14.7 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.14.7.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

C.14.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction and operation of Reconfigured Alternative #2 would have similar impacts to those analyzed for the PSPP as proposed since only the location of equipment and facilities would be altered.

C.14.7.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Worker Safety and Fire Protection would not change with Reconfigured Alternative #2, as both the project as proposed and Reconfigured Alternative #2 would have impacts below the level of significance. The same conditions of certification would be required for Reconfigured Alternative #2 and the project as proposed.

C.14.8 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;

- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

C.14.8.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern half of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located on primarily on public land managed by BLM; however, as with the proposed project, it include a 40 acre private parcel on which the applicant has a purchase option. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

C.14.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction and operation of Reconfigured Alternative #3 would have similar impacts to those analyzed for the PSPP as proposed since only the location of equipment and facilities would be altered.

C.14.8.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Worker Safety and Fire Protection would not change with Reconfigured Alternative #3, as both the project as proposed and Reconfigured Alternative #3 would have impacts below the level of significance. The same conditions of certification would be required for Reconfigured Alternative #3 and the project as proposed.

C.14.9 NO PROJECT/NO ACTION ALTERNATIVE

There are three No Project/No Action Alternatives evaluated in this section, as follows:

No Project/No Action Alternative #1:

No Action on Palen Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the

site. As a result, no construction safety and health and project operations and maintenance safety and health programs would be required and no impacts on local fire protection services would be created. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

No Project/No Action Alternative #2:

No Action on Palen Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Construction and operation requirements for solar technologies vary. However, it is expected that construction safety and health and project operations and maintenance safety and health programs would be required for all solar technologies and impacts to local fire protection services would be potentially generated. As such, it is expected that the impacts to worker safety and fire protection from a different solar technology would likely be similar to impacts from the proposed project.

No Project/No Action Alternative #3:

No Action on Palen Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction or operation of a solar facility. No construction safety and health and no maintenance safety and health programs would be required and no demands on local fire protection services would be made. Therefore, this No Project/No Action Alternative would not result in impacts to worker safety and fire protection. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.14.10 PROJECT-RELATED FUTURE ACTIONS

In order to transmit the power generated at the Palen Solar Power Project to the electricity grid, a new substation is required. Southern California Edison Company (SCE) proposes to construct and operate the substation, which will allow the electricity to be carried by the Devers-Palo Verde No. 1 (DPV1) 500 kilovolt (kV) transmission line.

The SCE Red Bluff Substation is a reasonably foreseeable project if the PSPP is approved and constructed as proposed. Therefore, this section examines the potential impacts of the construction and operation of the proposed substation. This substation would allow interconnection of the PSPP and other renewable projects in the Desert Center area.

The SCE Red Bluff Substation project will be fully evaluated in a future EIS prepared by the BLM. Because detailed design information is not yet available for the Red Bluff Substation, the impact analysis presented here is based on available information. The purpose of this analysis is to inform the Energy Commission, BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the PSPP.

The project components and construction activities associated with this substation are described in Section B.3 of this Staff Assessment/EIS, and a map of its location is presented as **Figure B.3-1**. This analysis examines the construction and operational impacts of a 230/500 kV substation that would be located on approximately 90 acres, south of Interstate 10 and southeast of Desert Center. Substation components will include 230 kV and 500 kV lines, 230/ 500 kV transformer banks, associated switchracks, and a microwave tower. The substation would be located in an existing CDCA utility corridor, north of and adjacent to the existing DPV1 500 kV transmission line.

C.14.10.1 Environmental Setting

The location of the substation and transmission line is currently served by the Riverside County Fire Department. The two nearest county fire stations are RCO Station #49, located in Desert Center (approximately 5 miles by road), and RCO Station #87, located approximately 50 miles west of the Red Bluff Substation site and would respond to hazardous materials incidents at the alternative site as well (RCFD 2010a). The environmental setting for the PSPP, described in Section C.14.4 above, provides more information regarding the Riverside County Fire Department.

C.14.10.2 Environmental Impacts

Industrial environments are potentially dangerous during both construction and operation. Workers at the project site would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress. Workers may sustain falls, trips, burns, lacerations, and other injuries. They may be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks or electrocution. It is important that SCE has well-defined policies and procedures,

training, and hazard recognition and control to minimize these hazards and protect workers. If the project complies with all LORS, workers would be adequately protected from health and safety hazards.

During construction and operation of the substation there is the potential for both small fires and major transformer fires. Electrical sparks; combustion of fuel oil, hydraulic fluid, mineral oil, insulating fluid at the substations, or flammable liquids; explosions; and overheated equipment may cause small fires. Major structural fires are unlikely at the substation but have occurred when transformers explode and catch fire. Fires and explosions of flammable gasses or liquids are rare. Compliance with all LORS would be adequate to ensure protection from all fire hazards.

The project would rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the Riverside County Fire Department.

C.14.10.3 Mitigation

Mitigation for the substation site should be similar to the Conditions of Certification for the PSPP itself. This would require SCE to provide a project construction safety and health program, a project operations and maintenance safety and health program, and participate in funding increased equipment and staffing for the RCFD.

C.14.10.4 Conclusion

Incorporation of the measures discussed above and the Conditions of Certification recommended for the PSPP would ensure adequate levels of industrial safety and fire protection and would comply with applicable LORS. The substation project would not be likely to have significant impacts on local emergency and fire protection services if the proposed Conditions of Certification are implemented.

C.14.11 CUMULATIVE IMPACTS

Section B.3, Cumulative Scenario, provides detailed information on the potential cumulative solar and other development projects in the project area. Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed project. In summary, these projects are:

- Renewable energy projects on BLM, State, and private lands, as shown on **Cumulative Scenario Figure 1** and in **Cumulative Scenario Tables 1A** and **1B.** Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable projects currently proposed in California.
- Foreseeable future projects in the immediate area as shown on **Cumulative Scenario Figure 2, I-10 Corridor Existing and Future/Foreseeable Projects**, and **Cumulative Scenario Tables 2** and **3**. Table 2 presents existing projects in this area and Table 3 presents future foreseeable projects in the I-10 Corridor Area. Both tables indicate project name and project type, its location and its status.

These projects are defined within a geographic area that has been identified by the Energy Commission and BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under CEQA . Even if the cumulative projects described in Section B.3 have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this section.

C.14.11.1 GEOGRAPHIC SCOPE OF ANALYSIS

The geographic areas considered for cumulative impacts on Worker Safety/Fire Protection are within the project boundaries and regional impacts along the Interstate 10 corridor in eastern Riverside County.

C.14.11.2 EFFECTS OF PAST AND PRESENT PROJECTS

For this analysis, there are three projects or developments in the area or region that would require the response from off-site fire departments for fire, HazMat, or EMS emergencies that staff has found to have an impact on the region. The need for fire department response to solar power plants may not be frequent but past experience has shown that there is a significant chance that it will occur. One power plant in the area, the Blythe Power Plant I, is not considered by staff to have had an impact on the area.

Staff has analyzed the potential for Worker Safety and Fire Protection cumulative impacts at many other power plant projects in California. A significant cumulative Worker Safety/Fire Protection impact is defined as the simultaneous need for a fire department to respond to multiple locations such that its resources and those of the mutual aid fire departments (which routinely respond in every-day situations to emergencies at residences, commercial buildings, and heavy industry) are over-whelmed and cannot effectively respond. Existing locations that might require a fire department response along with those facilities which might likely be built were considered. Staff believes that while cumulative impacts are theoretically possible, they are not probable because of the many safeguards implemented to both prevent and control fires, HazMat releases, and injuries/accidents and the locations of these existing facilities are not distant from RCFD fire stations such that the response times are adequate. Staff therefore believes the impacts on the local fire department from past and present projects would be insignificant.

C.14.11.3 FORESEEABLE FUTURE PROJECTS

Worker Safety and Fire Protection at the proposed project is also expected to be affected by reasonably foreseeable future projects, including the proposed Blythe and Genesis solar projects proposed for the I-10 corridor.

Contribution of the Palen Solar Power Project to Cumulative Impacts

Construction. The construction of the PSPP is expected to result in short term adverse impacts related to Worker Safety and Fire Protection during construction activities. It is expected that some of the cumulative projects described above which are not yet built may be under construction the same time as the PSPP and therefore short term

impacts related to Worker Safety/Fire Protection during construction of those cumulative projects may occur.

Operation. The operation of the PSPP is expected to result in long term adverse impacts during operation of the project related to Worker Safety/Fire Protection. Staff has analyzed the potential for Worker Safety and Fire Protection cumulative impacts at many other power plant projects in California. A significant cumulative Worker Safety/Fire Protection impact is defined as the simultaneous need for a fire department to respond to multiple locations such that its resources and those of the mutual aid fire departments (which routinely respond in every-day situations to emergencies at residences, commercial buildings, and heavy industry) are over-whelmed and cannot effectively respond. Existing locations that might require a fire department response along with those facilities which might likely be built were considered. Staff believes that cumulative impacts are possible and although they are not highly probable because of the many safeguards implemented to both prevent and control fires, HazMat releases, and injuries/accidents, due to their distant locations and wide expansive sites, cumulatively they present a significant impact. Additionally, even though the chances of two or more solar power plants requiring emergency response simultaneously may be low, once again a response to one distant site would preclude a simultaneous response to another solar plant or even a residential or commercial location in a timely and adequate manner due to the great distances involved. Staff therefore believes the impacts on the local fire department would be cumulatively significant.

The applicant will develop and implement a fire prevention program for the PSPP independent of any other projects considered for potential cumulative impacts and will be required to fund capital improvements and staffing for the RCFD. Staff believes that the facility, as proposed by the applicant and with the additional mitigation measures proposed by staff, will then have an insignificant impact on fire, HazMat, or EMS response. Therefore, staff concludes that with mitigation, the PSPP's contribution to a Worker Safety and Fire Protection cumulative impact would be less than significant.

Decommissioning. The decommissioning of the PSPP is not expected to result in adverse impacts related to Worker Safety and Fire Protection. It is unlikely that the construction or decommissioning of any of the cumulative projects would occur concurrently with the decommissioning of this project, because the decommissioning is not expected to occur for approximately 40 years. As a result, it is not expected that significant impacts related to Worker Safety/Fire Protection during decommissioning of the PSPP generated by the cumulative projects will occur.

C.14.12 COMPLIANCE WITH LORS

Staff concludes that construction and operation of the PSPP project with staff's proposed mitigation would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of worker safety and fire protection.

C.14.13 NOTEWORTHY PUBLIC BENEFITS

Staff is unable to describe any noteworthy pubic benefit in the area of Worker Safety and Fire Protection.

C.14.14 RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comment: In an April 23, 2010 letter, the California Department of transportation (Caltrans) noted that the project owner will be responsible for maintaining the access road off the Corn Springs Road Interchange with I-10.

Response: Staff has included a proposed Condition of Certification (**WORKER SAFETY-6**) that will require the project owner to maintain the primary and secondary access roads.

C.14.15 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

WORKER SAFETY-1 The project owner shall submit to 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 heat stress protection plan that implements and expands on existing Cal OSHA regulations as found in 8 CCR 3395;
- a Construction Emergency Action Plan; and
- a Construction Fire Prevention Plan that includes the concrete batch plant and the above-ground fuel depot.

The Personal Protective Equipment Program, the Exposure Monitoring Program, the Heat Stress Protection Plan, and the Injury and Illness Prevention Program shall be submitted to 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 Riverside County Fire Department for review and comment prior to submittal to the CPM for approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to 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 CPM from the Riverside County Fire Department stating the fire department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to 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 Operation heat stress protection plan that implements and expands on existing Cal OSHA regulations (8 CCR 3395);
- a Best Management Practices (BMP) for the storage and application of herbicides;
- an Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Plan that includes the fuel depot should the project owner elect to maintain and operate the fuel depot during operations (8 Cal Code Regs. § 3221); and
- Personal Protective Equipment Program (8 Cal Code Regs, §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, Heat Stress Protection Plan, BMP for Herbicides, and Personal Protective Equipment Program shall be submitted to the CPM for review and comment concerning compliance of the programs with all applicable safety orders. The Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Riverside County Fire Department for review and comment.

Verification: At least 30 days prior to the start of first-fire or commissioning, the project owner shall submit to 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 the CPM from the Riverside County Fire Department stating the fire department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

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 and emergency response reports for injuries and inform the CPM of safety-related incidents; and

- assure that all the plans identified in Conditions of Certification **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 the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement CSS shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- summary report of safety management actions and safety-related incidents that occurred during the month;
- report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- 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 to be 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 will be responsible for verifying that the Construction Safety Supervisor, as required in Condition of Certification Worker Safety-3, implements all appropriate Cal/OSHA and Energy 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 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 and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. 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 the CPM for review and approval.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit to the CPM proof that a portable automatic external defibrillator (AED) exists on site and a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 The project owner shall:

a. Provide a second access gate for emergency personnel to enter the site. This secondary access gate shall be at least one-quarter mile from the main gate.

b. Provide a second access road that comes to the site. This road shall be at a minimum an all-weather gravel road, at least 20 feet wide, and shall come from the Interstate-10 right-of-way to the project site at the location of where the fence line of the eastern solar field comes the nearest to the I-10 right-of-way. A locked gate shall be placed in the I-10 right-of-way fence. The RCFD, the California Highway Patrol, and the Riverside County Sheriff's Department shall be given access to the gate.

c. Maintain the main access road and the second road and provide a plan for implementation.

Plans for the secondary access gate, the method of gate operation, secondary gravel road, and to maintain the roads shall be submitted to the Riverside County Fire Department for review and comment and to the CPM for review and approval.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit to the Riverside County Fire Department and the CPM preliminary plans showing the location of a second access gate to the site, a description of how the gate will be opened by the fire department, and a description and map showing the location, dimensions, and composition of the main road, and the gravel road to the second gate. At least 30 days prior to the start of site mobilization, the project owner shall submit final plans plus the road maintenance plan to the CPM for review and approval. The final plan submittal shall also include a letter containing comments from the Riverside County Fire Department or a statement that no comments were received.

WORKER SAFETY-7 The project owner shall either:

(1) reach an agreement with the Riverside County Fire Department regarding funding of its project-related share of capital costs to build fire protection/response infrastructure and provide appropriate equipment as mitigation of project-related impacts on fire protection services, **or**, if no agreement can be reached shall

(2) fund its share of the capital costs in the amount of $850,000 and shall provide an annual payment of $375,000 to the RCFD for the support of three fire department staff commencing with the date of site mobilization and continuing annually thereafter on the anniversary until the final date of power plant decommissioning.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall provide to the CPM for review and approval either:

(1) A copy of the agreement with the RCFD or

(2) Documentation that a letter of credit in the amount of $850,000 has been provided to the RCFD and that a letter of credit in the amount of $375,000 will be provided each year at the start of commercial operations.

WORKER SAFETY-8 The project owner shall place a water spray system on the two LPG storage tanks. The engineering design plans shall comply with NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection* and be provided to the CPM for review and approval prior to commencing construction of the water spray system.

Verification: At least 30 days prior to site mobilization, the project owner shall provide the engineering design plans to the CPM for review and approval.

At least 30 days prior to the delivery of any LPG to the facility, the project owner shall provide a written statement to the CPM that the LPG tank water spray system has been built and successfully tested.

WORKER SAFETY-9 The project owner shall develop and implement an enhanced Dust Control Plan that includes the requirements described in **AQ-SC3** and additionally requires:

i) site worker use of dust masks (NIOSH N-95 or better) whenever visible dust is present;

ii) implementation of Rule 402 of the Kern County Air Pollution Control District (as amended Nov. 3, 2004); and

iii) implementation of enhanced dust control methods (increased frequency of watering, use of dust suppression chemicals, etc. consistent with **AQ-SC4**) immediately whenever visible dust comes from or onto the site or when PM10 measurements obtained when implementing ii (above) exceed 50 $\mu g/m^3$.

Verification: At least 30 days prior to the commencement of site mobilization, the enhanced Dust control Plan shall be provided to the CPM for review and approval.

C.14.16 CONCLUSIONS

Staff concludes that if the applicant for the proposed PSPP project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY-1**, and **-2** and fulfils the requirements of Conditions of Certification **WORKER SAFETY-3** through **-8**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. With the implementation of staff's proposed Condition of Certification **WORKER SAFETY-9** (enhanced dust control measures), the potential impacts of valley fever would be minimized. Staff also concludes that the operation of this power plant, with mitigation, would not significantly impact the provision of emergency services.

C.14.17 REFERENCES

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D. ENGINEERING ANALYSIS

D.1 – FACILITY DESIGN

Testimony of Shahab Khoshmashrab

D.1.1 SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the design, construction, and eventual closure of the project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed conditions of certification, below, would ensure compliance with these laws, ordinances, regulations and standards.

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

D.1.2 INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Palen Solar Power Project (PSPP). The purpose of this analysis is to:

- Verify that the laws, ordinances, regulations and standards (LORS) that apply to the engineering design and construction of the project have been identified;
- Verify that both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project would be designed and constructed in accordance with all applicable engineering LORS, which would ensure the public health and safety;
- Determine whether special design features should be considered during final design to address conditions unique to the site which could influence public health and safety; and
- Describe the design review and construction inspection process and establish the conditions of certification used to monitor and ensure compliance with the engineering LORS, in addition to any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS that apply to facility design;
- Evaluation of the applicant’s proposed design criteria, including identification of criteria essential to public health and safety;
- Proposed modifications and additions to the application for certification (AFC) necessary for compliance with applicable engineering LORS; and
- Conditions of certification proposed by staff to ensure that the project would be designed and constructed to comply with all applicable engineering LORS, which would ensure public health and safety.

D.1.3 LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (Solar Millennium 2009a, Appendix C). Key LORS are listed in **Facility Design Table 1,** below:

Facility Design Table 1
Key Engineering Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards
State	2007 (or latest edition) California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	Riverside 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)

D.1.4 PROPOSED PROJECT

D.1.4.1 SETTING AND EXISTING CONDITIONS

PSPP would be built on a site located in Riverside County, California. For more information on the site and its related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the AFC, Appendix C (Solar Millennium 2009a).

D.1.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project would be built to applicable engineering codes, which would ensure public health and life safety. This analysis further verifies that applicable engineering LORS have been identified and that the project and its ancillary facilities have been described in adequate detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification that would monitor and ensure compliance with engineering LORS and any other special design requirements. These conditions allow both the California Energy Commission (Energy Commission) compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme that would verify compliance with these LORS.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access, in addition to the criteria for designing and constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes the use of accepted industry standards (see Solar Millennium 2009a, Appendix C, for a representative list of applicable industry standards), design practices, and construction methods in preparing and developing the

site. Staff concludes that this project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes conditions of certification (see below and the **Geology and Paleontology** section of this document) to ensure that compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. Major structures and equipment are identified in the proposed Condition of Certification **GEN-2**, below. Typically, **Facility Design Table 2** in Condition of Certification **GEN-2** lists the major structures and equipment identified in the AFC and other project related information available before project licensing; this list is based on the preliminary design of the project. The master drawing and master specifications lists described in Condition of Certification **GEN-2**, however, include the project-related documents based on the project's detailed design and may include additional documents for structures and equipment not identified in **Facility Design Table 2**. (Detailed project design typically occurs after project licensing and is not available at this time.)

PSPP shall be designed and constructed to the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards 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 other applicable codes and standards in effect when the design and construction of the project actually begin. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2007 CBSC takes effect, the 2007 CBSC provisions shall be replaced with the updated provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed according to their appropriate lateral force procedure, staff has included condition of certification **STRUC-1**, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

PROJECT QUALITY PROCEDURES

The project's AFC (Solar Millennium 2009a, Appendix C) describes a quality program intended to inspire confidence that its systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with all appropriate power plant technical codes and standards. Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality assurance/quality control (QA/QC) program will ensure that PSPP is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the CBO is authorized and directed to enforce all provisions of the CBC. The Energy Commission itself serves as the building official, and has the responsibility to enforce the code, for all of the energy facilities it certifies. In addition, the Energy Commission has the power to interpret the CBC and adopt and enforce both rules and supplemental regulations that clarify application of the CBC's provisions.

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures that all facility design conditions of certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The applicant, through permit fees provided by the CBC, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the applicant pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite Riverside County or a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity to outline both its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the engineers who will design and build the proposed project (conditions of certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. They also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written so that no element of construction (of permanent facilities subject to CBO review and approval) which could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from “mothballing” to removal of all equipment and appurtenant facilities and restoration of the site. Future conditions that may affect the decommissioning decision are largely unknown at this time.

In order to assure that decommissioning of the facility will be completed in a manner that is environmentally sound, safe and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
- all applicable LORS, local/regional plans and the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
- the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- decommissioning alternatives, other than complete site restoration.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure plan.

D.1.4.3 CEQA LEVEL OF SIGNIFICANCE

As described in the **Introduction** above, the Facility Design section addresses LORS consistency and provides the agencies a vehicle for verifying compliance with these LORS during construction, operation, and closure of power generating facilities. Compliance with LORS is sufficient to avoid any impacts under CEQA.

D.1.5 RECONFIGURED ALTERNATIVE

The conclusions reached concerning the proposed project would be the same for the reconfigured alternative and the same conditions of certification would apply.

D.1.6 REDUCED ACREAGE ALTERNATIVE

The conclusions reached concerning the proposed project would be the same for the reduced acreage alternative and the same conditions of certification would apply.

D.1.8 NO PROJECT / NO ACTION ALTERNATIVE

Not applicable.

D.1.9 CUMULATIVE IMPACT ANALYSIS

Not applicable.

D.1.10 COMPLIANCE WITH LORS

A detailed discussion of the proposed project's compliance with LORS applicable to facility design is provided above in subsection D.1.4.2.

D.1.11 NOTEWORTHY PUBLIC BENEFITS

Staff has not identified any noteworthy public benefits associated with this Facility Design section.

D.1.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

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 Building Standards 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 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, maintenance, or closure of the completed facility. All transmission facilities (lines, switchyards, switching stations and substations) are covered in the conditions of certification in the **Transmission System Engineering** section of this document.

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 the 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 the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO.

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will 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 the CPM and the CBO with a schedule of facility design submittals, and master drawings and master specifications list. The master drawings and master specifications list shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures, systems, and equipment. Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. The schedule shall contain the date of each submittal to the CBO. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM upon request.

Verification: At least 60 days (or a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, and the master drawings and master specifications list of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures, systems, and equipment defined above in Condition of Certification **GEN-2**. Major structures and equipment shall be added to or deleted from the list only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

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 to be negotiated between the project owner and the CBO, in accordance with the 2007 CBC. These fees 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 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, or a structural or civil engineer, as the resident engineer (RE) in charge of the project. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of certification in the **Transmission System Engineering** section of this document.

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 resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

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 the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or 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 the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five 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 the CPM of the CBO's approval of the new engineer within five 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 handled in the conditions of certification in the **Transmission System Engineering** section of this document.

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.

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 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;
3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC (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.

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 CBC (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 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 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 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 the CPM of the CBO's approvals of the responsible 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 resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, including prefabricated assemblies, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2007 CBC. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **Transmission System Engineering** section of this document.

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. Inspect 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 and the CPM for corrective action; and
4. Submit a final signed report to the RE, CBO, and 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 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 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 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 five 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 the CPM of the CBO's approval of the newly assigned inspector within five 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. 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 the CPM in the next monthly compliance report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action 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 the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify 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 another accessible location during the operating life of the project. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to 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 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 shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to 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.

Verification: At least 15 days (or 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.

Verification: The project owner shall notify 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 to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 2007 CBC. 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, and the CPM. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a non-conformance report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO 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.

Verification: Within 30 days (or 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 the CPM. The project owner shall submit a copy of the CBO's approval to 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 2** 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 2**, 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;
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;
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; and
5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS.

Verification: At least 60 days (or 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 2** 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 the CPM.

The project owner shall submit to 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.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five 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 the CPM. The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five 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 the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action 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 to the CBO prior notice of the intended filing.

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 the CPM. The project owner shall notify 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 shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or 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 the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to 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 2**, 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.

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, 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
- Riverside County codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

Verification: At least 30 days (or 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 2**, 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 the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to 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.

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 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 the CPM.

The project owner shall transmit to 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.

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.

Verification: At least 30 days (or 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 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. 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. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **Transmission System Engineering** section of this document.

A. Final plant design plans shall include:

1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V 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 V systems;
6. system grounding requirements; and
7. lighting energy calculations.

C. The following activities shall be reported to 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 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 the CPM a copy of the transmittal letter in the next monthly compliance report.

D.1.13 CONCLUSIONS

The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents directly apply to the project.

Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, and concludes that the design, construction, and eventual closure of the project will likely comply with applicable engineering LORS.

The proposed conditions of certification will ensure that PSPP is designed and constructed in accordance with applicable engineering LORS. This will be accomplished through design review, plan checking, and field inspections that will be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

Though future conditions that could affect decommissioning are largely unknown at this time, it can reasonably be concluded that if, the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to decommissioning, decommissioning procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS;
2. The project be designed and built to the 2007 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for review); and
3. The CBO reviews the final designs, checks plans, and performs field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

D.1.14 REFERENCES

Solar Millennium 2009a – Solar Millennium (tn: 52939). Application for Certification Vol 1 & 2, dated 8/24/2009

D.2 – GEOLOGY, PALEONTOLOGY, AND MINERALS

Testimony of Patrick Pilling, Ph.D., P.E., G.E., D.GE.

D.2.1 SUMMARY OF CONCLUSIONS

The proposed Palen Solar Power Project (PSPP) site is located in a moderately active geologic area of the eastern Mojave Desert geomorphic province in eastern Riverside County in southeastern California. The main geologic hazards at this site include strong ground shaking, hydrocompaction, dynamic compaction, expansive soils, and corrosive soils. These potential hazards can be effectively mitigated through facility design by incorporating recommendations contained in a design-level geotechnical report as required by the California Building Code (CBC 2007) and Condition of Certification **GEO-1.** Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section, should also mitigate these impacts to a less than significant level.

The proposed project area is currently not used for mineral production, nor is it under claim, lease, or permit for the production of locatable, leasable, or salable minerals. Sand and gravel resources are present at the site and could potentially be a source of salable resources; however, such materials are present throughout the regional area such that the PSPP should not have a significant impact on the availability of such resources. There are no other known viable geologic or mineralogic resources at the PSPP site.

Locally, paleontological resources have been documented within lacustrine sediments in nearby Ford Dry Lake, and regionally in older Quaternary alluvium. Older alluvium and lacustrine deposits may underlie younger Quaternary alluvium at an undetermined but potentially shallow depth beneath the site surface. Potential impacts to paleontologic resources would be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-7**.

Based on its independent research and review Energy Commission staff believe that the potential is low for significant adverse impacts to the proposed project from geologic hazards during its design life and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project. It is staff's opinion that the proposed PSPP facility could be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety, to the extent practical.

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

D.2.2 INTRODUCTION

In this section, staff discusses the potential impacts of geologic hazards on the proposed PSPP site as well as the project's potential impacts to geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that there will be no consequential adverse impacts to significant geologic and paleontologic resources during the project construction, operation, and closure and that operation of the plant will not expose occupants to high-probability geologic hazards. A brief geologic and paleontologic overview is provided. The section concludes with staff's proposed monitoring and mitigation measures for geologic hazards and geologic, mineralogic, and paleontologic resources, with proposed conditions of certification.

D.2.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The CEQA Guidelines, Appendix G, provide a checklist of questions that lead agencies typically address.

- Section (V) (c) includes guidelines that determine if a project will either directly or indirectly destroy a unique paleontologic resource or site or a unique geologic feature.
- Sections (VI) (a), (b), (c), (d), and (e) focus on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) concern the project's effects on mineral resources.

The California Building Standards Code (CBSC) and CBC (2007) provide geotechnical and geologic investigation and design guidelines, which engineers must follow when designing a facility. As a result, the criteria used to assess the significance of a geologic hazard include evaluating each hazard's potential impact on the design and construction of the proposed facility. Geologic hazards include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, corrosive soils, landslides, tsunamis, and seiches. Of these, dynamic compaction, hydrocompaction, subsidence, corrosive soils, and expansive soils are geotechnical engineering issues but are not normally associated with concerns for public safety.

Staff has reviewed geologic and mineral resource maps for the surrounding area, as well as site-specific information provided by Palen Solar I, LLC[1] ("the applicant"), to determine if geologic and mineralogic resources exist in the area and to determine if operations could adversely affect geologic and mineralogic resources.

To evaluate whether the proposed project and alternatives would generate a potentially significant impact as defined by CEQA on mineral resources, the staff evaluated them against checklist questions posed in the 2006 CEQA Guidelines, Appendix G, Environmental Checklist established for Mineral Resources. These questions are:

[1] Chevron Energy Solutions and Solar Millennium have a joint development agreement. Chevron Energy Solutions applied for the Right Of Way for Palen Solar Power Project. To facilitate the permitting of the Palen Solar Power Project (PSPP), the Applicant is requesting that the CEC issue one license to a project-specific company. The company for PSPP is Palen Solar I, LLC a wholly owned subsidiary of Solar Millennium and the single Applicant for PSPP.

A. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state?

B. Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

Staff reviewed existing paleontologic information and requested records searches from the Natural History Museum of Los Angeles County (NHMLA) and the University of California Museum of Paleontology (UCMP) online database for the site area. Site-specific information generated by the applicant for the proposed PSPP was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP 1995) to determine whether any known paleontologic resources exist in the general area. If present or likely to be present, conditions of certification which outline required procedures to mitigate impacts to potential resources, are proposed as part of the project's approval.

The Antiquities Act of 1906 (16 United States Code [USC]) requires that objects of antiquity be taken into consideration for federal projects and the CEQA, Appendix G, also requires the consideration of paleontologic resources. The Paleontological Resources Preservation Act of 2009 requires the Secretaries of the United States Department of the Interior and Agriculture to manage and protect paleontologic resources on Federal land using scientific principles and expertise. The potential for discovery of significant paleontologic resources or the impact of surface disturbing activities to such resources is assessed using the Potential Fossil Yield Classification (PFYC) system. This system includes three conditions (Condition 1 [areas known to contain vertebrate fossils]; Condition 2 [areas with exposures of geological units or settings that have high potential to contain vertebrate fossils]; and Condition 3 [areas that are very unlikely to produce vertebrate fossils]). The PFYC class ranges from Class 5 (very high) for Condition 1 to Class 1 (very low) for Condition 3 (USDI 2007).

The proposed conditions of certification allow the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with laws, ordinances, regulations, and standards (LORS) applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is staff's opinion that the potential for significant adverse impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources from the proposed project, is low.

D.2.3.1 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Applicable LORS are listed in the application for certification (AFC) (Solar Millennium 2009a). The following briefly describes the current LORS for both geologic hazards and resources and mineralogic and paleontologic resources.

Geology and Paleontology Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Antiquities Act of 1906 (16 United States Code [USC], 431-433)	The proposed PSPP facility site is located entirely on land currently administered by the Bureau of Land Management (BLM). Although there is no specific mention of natural or paleontologic 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 Federal Highways Act of 1956, the National Park Service (NPS), the BLM, the Forest Service (USFS), and other Federal agencies.
Federal Land Policy and Management Act (FLPMA) of 1976 (43 USC 1701-1784)	Mandates that the BLM manage public lands under the principles of multiple use and sustained yield unless otherwise specified by law, and to protect the quality scientific, scenic, historical, archeological, and other values, and to develop 'regulations and plans for the protection of public land areas of critical environmental concern', which include 'important historic, cultural or scenic values'. Also charged with the protection of 'life and safety from natural hazards'.
Paleontologic Resources Preservation Act (PRPA) (Public Law [PL] 111-011)	Authorizes Departments of Interior and Agriculture Secretaries to manage the protection of paleontologic resources on Federal lands.
National Historic Preservation Act of 1966 (NHPA) (16 USC 470)	Establishes policies for the 'preservation of the prehistoric and historic resources of the United States', under the direction of the Secretary of the Interior and the BLM.
State	
California Building Code (CBC), 2007	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control).
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. Portions of the site and proposed ancillary facilities are located within designated Alquist-Priolo Fault Zones. The proposed site layout places occupied structures outside of the 50-foot setback 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 and 30244	Regulates removal of paleontologic resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Society for Vertebrate Paleontology (SVP), 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontologic resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
Local	
Riverside County General Plan 2000, Safety Element	Adopts the Uniform Building Code (UBC) (1997), which provides design criteria for buildings and excavations. The UBC is superseded by the CBC (2007). Requires mitigation measures for geologic hazards, including seismic shaking, surface rupture (adopts APEFZ Act), liquefaction, unstable soils and slopes, and flooding.

Applicable Law	Description
Riverside County General Plan 2000, Multipurpose Open Space Element	Provides for 'preservation of cultural, historical, archaeological, paleontologic, geologic and educational resources'. Also provides a map showing paleontologic sensitivity in the county.

D.2.4 PROPOSED PROJECT

D.2.4.1 SETTING AND EXISTING CONDITIONS

The applicant has applied for a right-of-way (ROW) grant for approximately 5,200 acres currently administered by the BLM (Solar Millennium 2009a). The proposed PSPP facility would be constructed on 3,870 acres within the 5,200 acre ROW (AECOM2010i). The roughly rectangular property is located approximately 10 miles east of Desert Center and lies just north of Interstate Highway 10 and southwest of Palen Dry Lake in southern Chuckwalla Valley, Riverside County. The site is approximately one-half way between the cities of Blythe and Indio, California. Site access is provided via exit 201 and Corn Springs Road from Interstate 10. The overall property includes one privately owned 40-acre parcel.

The proposed PSPP would be a primary concentrated solar electric power generating facility capable of producing 500 megawatts (MW) of electricity from two independent but identical plants (Solar Millennium 2009a). Each plant will employ parabolic trough solar thermal technology, which utilizes an adjustable array of mirrors that track the sun and focus solar energy towards a receiver tube. The receiver tube circulates a special heat transfer fluid which supplies heat to steam generators that drive steam turbine generators to create grid quality electricity.

Water for the project would be provided from ground water supply wells. The water would be treated to potable standards by an on-site packaged water treatment system, and an on-site sanitary septic system. Shared on-site facilities associated with the two solar plants would include a main office building, warehouse and maintenance building, a bioremediation land treatment unit, and raw, treated and deionized water storage tanks. Each plant would have its own transfer fluid surge tanks, back-up diesel generators, dry cooling towers, and propane gas-fired auxiliary boilers with propane supplied from on-site storage. A new 230 kilovolt (kV) electrical transmission line would occupy a corridor extending west from the PSPP site to the planned Southern California Edison Red Bluff Substation. The exact transmission line route has not been determined, but it is expected to cross geologic formations similar to those at the PSPP site.

Depending on the published reference, the proposed PSPP site is located in either the southeastern portion of the Mojave Desert geomorphic province (CGS 2002a), or the northeastern quarter of the Colorado Desert geomorphic province (Norris and Webb 1990), in the Mojave Desert of Southern California near the Arizona border. Geologically and geographically the area is more characteristic of the Mojave Desert geomorphic province. The Mojave Desert is a broad interior region of isolated mountain ranges which separate vast expanses of desert plains and interior drainage basins. The physiographic province is wedge-shaped, and separated from the Sierra Nevada and

Basin and Range geomorphic provinces by the northeast-striking Garlock Fault on the northwest side. The northwest-striking San Andreas fault defines the southwestern boundary, beyond which lie the Transverse Ranges. The Colorado Desert geomorphic province lies to the south and east of the proposed project area. The topography and structural fabric in the Mojave Desert is predominately southeast to northwest, and is associated with mid-Miocene to recent faulting oriented similar to the San Andreas Fault. A secondary east to west orientation correlates with structural trends in the Transverse Ranges geomorphic province.

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

Quaternary age alluvial, lacustrine and eolian sedimentary deposits are mapped in the vicinity of the proposed PSPP site (CDMG 1967; USGS 1989; USGS 1990). The local stratigraphy as interpreted by different authors, is presented in **Geology and Paleontology Table 2**.

Geology and Paleontology Table 2
Correlation and Ages of Stratigraphic Units

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

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

Exploration drilling conducted in 1978 by the U.S. Geological Survey (USGS) resulted in two boreholes in the Palen Dry Lake area, one of which lies within the boundaries of the proposed plant site. U.S. Geological Survey Borehole PDL#1 was advanced to a depth of 505 feet below ground surface (bgs) near the north-central boundary of Section 27

near the northeast corner of the proposed project ROW. The lithologic log of PDL#1 indicates the subsurface near the northern site boundary is composed of moderately to thickly bedded sands, gravels, and clays to a depth of approximately 55 feet where a transition to overall clay dominated formation takes place and continues to the total depth of the borehole. The interbedded clays, sands, and gravels probably represent periods of primarily lakebed deposition interspersed with episodes of coarse sediment transport from the nearby Chuckwalla and Palen Mountains. A gravel dominated bed present from approximately 90 to 110 feet also attests to a period of clastic deposition during a period of primarily lakebed sedimentation (Simoni Jr. 1981). A water exploration well, 06S/17E-03M01S, which was drilled in 1958 in what is now the southeast portion of the proposed PSPP site reportedly had a similar stratigraphic column with 48 feet of coarse alluvium overlying strata which are clay dominated to a depth of 818 feet bgs (CDWR 2009).

A preliminary geotechnical investigation including 13 exploratory borings and eight test pits has been completed for the general area of the PSPP site (Kleinfelder 2009). The preliminary geotechnical investigation reveals that the PSPP site is underlain by alluvial and eolian deposits of Pleistocene through Holocene age, which consist of dune sands, alluvium and lake deposits to the depths explored (approximately 76.5 feet below the existing ground surface). The PSPP site is generally surfaced with unconsolidated soils due to desiccation and/or wind deposition to a maximum depth of 2 feet below the existing grade. The soils below the surficial materials are generally medium dense to very dense poorly graded sand with varying amounts of silt, silty sand and clayey sand. Firm to very hard sandy clays are locally present as interbedded layers 5 to 10 feet thick at depths generally greater than 25 feet below existing grade. The near surface site soils are primarily granular with no to low swell potential; however, potentially expansive soils were observed at the ground surface in the northeastern portion of the site (Kleinfelder 2009). Loose dune sand was also observed at the ground surface and at depth in the southwestern portion of the site (Kleinfelder 2009). Collapse potential tests indicate the site soils exhibit a collapse potential in the range of 0 to 3.0% when inundated with water.

The proposed PSPP plant site is not crossed by any known active faults or designated Alquist-Priolo Earthquake Fault Zone (EFZ, formerly called Special Studies Zones) (CGS 2002b). A number of major, active faults lie within 62 miles of the site. These faults are discussed in detail under the **Geologic Hazards** section later in this section. Several northwest-striking, south-dipping basement thrust faults are mapped at the extreme southern end of the Palen Mountains, and are inferred beneath Quaternary and Tertiary sediments in Chuckwalla Valley (Harding and Coney 1985; CDMG 1967; USGS 1990; USGS 2006). These faults are part of a major Mesozoic terrain-bounding structural zone that was active during late Jurassic time, and are associated with folding and metamorphism in the Palen and McCoy Mountains. The basement faults are no longer active, and are not exposed anywhere on the surface of the proposed site.

Little is known regarding the depth to bedrock beneath the proposed PSPP site. Gravity investigations indicate the Chuckwalla Valley overlies three alluvium filled sub-basins separated by east to northeast-trending subsurface basement ridges. Gravity data indicate basin fill in Chuckwalla Valley ranges from approximately 650 feet deep across faulted subsurface basement ridges to greater than 6,000 feet deep near the sub-basin

centers. Analysis of gravity anomalies indicates the crystalline basement beneath the sediment filled basins is highly faulted and structurally complex (Rotstein et al. 1976). Review of gravity anomaly data suggests the proposed PSPP site is underlain at an undetermined depth by faulted tertiary non-marine and marine sedimentary, pyroclastic, and volcanic rocks.

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

D.2.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section considers two types of impacts. The first is geologic hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

D.2.4.2.1 Direct/Indirect Impacts and Mitigation

Ground shaking, hydrocompation, dynamic compaction, expansive soils, and corrosive soils represent the main geologic hazards at the proposed site. These potential hazards could be effectively mitigated through facility design by incorporating recommendations contained in the project geotechnical evaluation as required by **GEO-1**. Proposed Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section should also mitigate these impacts to a less than significant level.

The proposed project site is currently not used for mineral production, nor is it under claim, lease, or permit for the production of locatable, leasable, or salable minerals. Sand and gravel resources are present at the site; however, such materials are present throughout the regional area such that the PSPP should not have a significant impact on the availability of such resources. In addition, the potential resource would become available again following decommissioning of the project. Only limited exploration for oil and gas resources has been performed in the area, and no active oil or gas operations are located in the immediate vicinity of the project. As a result, the PSPP would not impact any current or reasonably foreseeable development of geologic or mineral resources.

Staff has reviewed the paleontologic resources assessment in Section 5.9 and Appendix H of the AFC (Solar Millennium 2009a; SWCA 2009). Staff has also reviewed correspondence from NHMLA (McLeod 2009); UCMP; and the Riverside County Land Information System (RCLIA 2009) for information regarding known fossil localities and stratigraphic unit sensitivity within the proposed project area. All research was conducted in accordance with accepted assessment protocol (SVP 1995) to determine whether any known paleontologic resources exist in the general area. If present or likely to be present, conditions of certification which outline required procedures to mitigate impacts to potential resources are included as part of the projects approval.

Based on the above research, SVP criteria, the paleontologic report appended to the AFC (Solar Millennium 2009a) and the confidential paleontologic information filing (Solar Millennium 2009b), staff considers that there is a high probability that paleontologic resources will be encountered during grading and excavation in the older Quaternary age alluvial and lacustrine sediments. Further, deeper excavations in the younger alluvium that will encounter the underlying older Quaternary age alluvial soils will also have a high probability to encounter paleontologic resources. Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate potential impacts to paleontologic resources to less than significant levels. These conditions essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (paleontologic resource specialist [PRS]).

The proposed conditions of certification allow the Energy Commission's CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

Based on this information and proposed conditions of certification, it is staff's opinion that the potential for significant adverse, direct or indirect impacts to the project, from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources, from the proposed project, is low.

Geologic Hazards

Review of the AFC (Solar Millennium 2009a) and the site-specific subsurface information (Kleinfelder 2009), coupled with staff's independent research, indicate that the possibility of geologic hazards significantly affecting the operation of the plant site during its practical design life is low. However, geologic hazards must be addressed in a design-level project geotechnical report per CBC (2007) requirements and proposed Condition of Certification **GEO-1**.

Staff's independent research included the review of available geologic maps, reports, and related data of the proposed PSPP plant site. Geologic information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG, now know as CGS), the USGS, the American Geophysical Union, the Geologic Society of America, the Southern California Earthquake Data Center (SCEDC), and other organizations.

Faulting and Seismicity

Energy Commission staff reviewed numerous CGS, CDMG and USGS publications as well as informational websites in order to gather data on the location, timing, and type of faulting in the proposed project area. Type A and B faults within 63 miles (100 kilometers) of the proposed PSPP site are listed in **Geology and Paleontology Table 3**. Type A faults have slip-rates of $\geq$5 mm per year and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm per year and are capable of producing an earthquake of magnitude 6.5 to 7.0. The fault type, potential magnitude, and distance from the site are summarized in **Geology and Paleontology Table 3**. Because of the large size of the proposed site the distances to faults are measured from a point between the two proposed power blocks within the site.

Geology and Paleontology Table 3
Active Faults Relative to the Proposed Palen Solar Power Project Site

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

Other Type C and otherwise undifferentiated faults which are more than 20 miles from the proposed site are not discussed here because they are unlikely to undergo movement or generate seismicity which could affect the project.

Eleven Type A and B faults and fault segments were identified within 63 miles of the proposed PSPP site (**Geology and Paleontology Table 3).** Of these, none are within 35 miles of the site. Eight of the faults are Type A right-lateral, northwest-trending strike-slip fault systems that are part of or subparallel to the San Andreas Fault System. Two of the remaining three faults are Type B, are east-west to northeast-striking, and are left-lateral strike-slip faults with characteristics similar to the Garlock Fault, which bounds the northwestern side of the Mojave Desert geomorphic province (CGS 2002a). All fault zones in **Geology and Paleontology Table 3** are subject to the Alquist-Priolo Earthquake Fault Zoning Act of 1972 (CDMG 2003).

The proposed PSPP site is located just southwest of the Mojave-Sonoran Belt, a roughly 60-mile-wide structural belt that has been correlated with the southern extension of the Walker Lane Fault Zone (USGS 1991). The western boundary for the structural zone, located 5 to10 miles northeast of the proposed site, is marked by an abrupt termination of north- and northeast-trending mountain ranges and basins to the east that are characteristic of the San Andreas Fault Zone, and northwest-trending strike-slip faulting to the west. The Mojave-Sonoran Belt is notable for its relative lack of seismicity and recent faulting (USGS 1991). The region has experienced a low frequency of Pliocene faulting, and Pleistocene faults are nearly absent. These characteristics are unusual given its proximity to areas of intense faulting and frequent seismicity, such as the Eastern California Shear Zone (Dokka and Travis 1990) to the northwest and the Salton Trough to the southwest.

The close proximity of the proposed PSPP site to the Mojave-Sonoran belt and relatively great distance from more seismically active areas to the west and northwest would suggest a relatively low to moderate probability of intense ground shaking in the project area. However, events such as the Landers earthquake (7.6 Mw), which occurred on June 28, 1992 approximately 78 miles from the proposed site (Blake 2000b), demonstrate that the proposed site could be subject to moderate levels of earthquake-related ground shaking in the future. The effects of ground shaking, which would most likely include aesthetic damage and slight damage to structural connections, would need to be mitigated, to the extent practical, through structural designs required by the California Building Code (CBC 2007) and the site-specific project geotechnical report required by the CBC and Condition of Certification **GEO-1**.

The appropriate soil profile for the PSPP site is Type D based on information contained in the project geotechnical report (Kleinfelder 2009). The estimated bedrock peak horizontal ground acceleration (Site Class D) for the power plant is 0.27 times the acceleration of gravity (0.27g) based on 2% probability of exceedence in 50 years under 2007 CBC criteria (USGS 2008a). Determination of the peak horizontal ground acceleration at the ground surface will require additional analysis once a design-level geotechnical report has been prepared for the project.

Liquefaction

Liquefaction is a condition in which a saturated cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake. However, the potential for liquefaction of strata deeper than approximately 40 feet below surface is considered negligible due to the increased confining pressure and because geologic strata at this depth are generally too compact to liquefy.

The PSPP site is located within an area with low to moderate level of liquefaction potential as delineated by RCLIA (2009). However, the estimated depth to ground water based on measured values in boreholes and wells near the proposed site is greater than 60 feet below existing grade (Kleinfelder 2009; Solar Millennium 2009a). In addition, the typical medium dense to very dense nature of the coarse grain soils encountered in the PSPP borings (Kleinfelder 2009) indicates that there is no liquefaction potential at the PSPP site (Kleinfelder 2009).

Lateral Spreading

Lateral spreading of the ground surface can occur within liquefiable beds during seismic events. Lateral spreading generally requires an abrupt change in slope; that is, a nearby steep hillside or deeply eroded stream bank. Other factors such as distance from the epicenter, magnitude of the seismic event, and thickness and depth of liquefiable layers also affect the amount of lateral spreading. Because the proposed PSPP site is not subject to catastrophic liquefaction-induced settlement, the potential for lateral spreading during seismic events would be negligible due to the low relief and very shallow slopes at the proposed site surface.

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements. The proposed site is generally underlain by medium dense to very dense granular soils. However, loose sand layers are occasionally present at the surface and as buried layers at the project site (Kleinfelder 2009). The potential for and mitigation of the effects of dynamic compaction of site soils during an earthquake should be addressed in a project-specific geotechnical report as required by the CBC (2007) and proposed Condition of Certification **GEO-1**. 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.

Hydrocompaction

Hydrocompaction (also known as hydro-collapse) is generally limited to young soils that were deposited rapidly in a saturated state, most commonly by a flash flood. The soils dry quickly, leaving an unconsolidated, low density deposit with a high percentage of voids. Foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation dissolves the weak cementation that is preventing the immediate collapse of the soil structure. The depositional environment of the Chuck-walla Valley suggests that the soils may be subjected to hydrocompaction. The project geotechnical report indicates that there is a low to moderate hydrocompaction potential based on the geotechnical data and the observation of soil profile in the test pits (Kleinfelder 2009). The potential for and mitigation of the effects of hydrocompaction of site soils should be addressed in a project-specific geotechnical report as required by the CBC (2007) and proposed Condition of Certification **GEO-1**. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations depending on severity and foundation loads.

Subsidence

The Riverside County General Plan indicates the basin fill sediments in Chuckwalla Valley are susceptible to subsidence (RCLIA 2008). Regional ground subsidence is typically caused by petroleum or ground water withdrawal that increases the effective unit weight of the soil profile, which in turn increases the effective stress on the deeper soils. This results in consolidation or settlement of the underlying soils. However, even during the 1980's and 1990's when regional ground water extraction was at its historic

maximum of approximately 48,000 acre-feet per year (ac-ft/yr) no localized or regional subsidence was recorded. Current ground water withdrawals are reportedly only approximately 2,000 ac-ft/yr and even the proposed project demand of an additional 300 ac-ft/yr will not approach historic pumping demands. Additional information with respect to historical and anticipated ground water pumping is contained in the **Soil and Water Resources Section C.6.** In addition, no petroleum or natural gas withdrawals are taking place in the proposed site vicinity. Therefore, the potential for local or regional ground subsidence resulting from petroleum, natural gas, or ground water extraction is considered to be very low.

Local subsidence or settlement may also occur when areas containing compressible soils are subjected to foundation or fill loads. The typical medium dense to very dense granular site soils are indicative of low to negligible local subsidence. Clay layers present at depth are typically deeper than the anticipated zone of influence of shallow foundations and would therefore not be subjected to consolidation settlement from surcharge loading from conventional shallow foundations.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist in place at a moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, water line breaks, etc. causes the clay soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to excessive movement (heave) of overlying structural improvements. The preliminary geotechnical report for the project did encounter potentially expansive clay soils at the ground surface in the northeastern portion of the site (Kleinfelder 2009). However, interbedded layers of clay soils are present in the subsurface soil profile in this area. As a result, there is the potential for expansive soils to be present at the locations of proposed structural improvements. The potential for and mitigation of the effects of expansive site soils should be addressed in a project-specific geotechnical report as required by the CBC (2007) and proposed Condition of Certification **GEO-1**. Typical mitigation measures would include over-excavation/replacement or deep foundations depending on severity and foundation loads.

Corrosive Soils

Fine grain soils with high in-situ moisture contents that contain sulfides can be corrosive to buried metal pipe, which can lead to premature pipe failure and leaking. Such soils are present at this site, and the preliminary geotechnical investigation (Kleinfelder 2009) indicates that site soils could be potentially corrosive to metal pipe. The effects of corrosive soils can be effectively mitigated through final design by incorporating the recommendations of the site-specific project geotechnical report required by the CBC and Condition of Certification **GEO-1**. Mitigation of corrosive soils with respect to metal pipe typically involves cathodic protection or polyethylene encasement of the pipe.

Landslides

Due to the low site gradient and the absence of topographically high ground in the immediate site vicinity, the potential for landslide impacts to the site is considered to be negligible.

Flooding

The proposed PSPP area has not been mapped by the Federal Emergency Management Agency (FEMA) for flood potential (FEMA 2009). Because the proposed site is topographically higher than Palen Dry Lake to the north, it is staff's opinion that the potential for flooding at the site is limited to infrequent high volume (flash flood) events which may occur due to heavy rainfall in the Chuckwalla Mountains southwest of the site. Storm waters would be carried across the proposed site from roughly southwest to northeast via existing drainages. Site drainage would be modified during project construction and other engineering improvements will also be made to mitigate potential impacts due to catastrophic flooding (Solar Millennium 2009). Additional information is contained in the **Soil and Water Resources Section C.6.**

Tsunamis and Seiches

The proposed PSPP site is not located near any significant surface water bodies, and therefore the potential for impacts due to tsunamis and seiches is considered to be negligible.

Volcanic Hazards

The proposed PSPP site is located approximately 40 miles west of the Lavic Lake volcanic hazard area (VHA), an approximately 14-square-mile area within the Mojave Desert comprised of Miocene to Holocene age dacitic to basaltic flows, pyroclastic rocks, and volcaniclastic sediments (Glazner 2000). The Lavic Lake VHA has been designated by the USGS as an area subject to lava flows and tephra deposits associated with basalt or basaltic andesite vents (Miller 1989). The Amboy Crater – Lavic Lake VHS is also considered to be subject to future formation of cinder cones, volcanic ash falls, and phreatic explosions. The recurrence interval for eruptions has not been determined, but is likely to be in the range of one thousand years or more. Because the proposed PSPP site is not located within a designated volcanic hazard area, staff considers the likelihood of significant impacts to the project resulting from volcanic activity would be low.

Geologic, Mineralogic, and Paleontologic Resources

Geologic and Mineralogic Resources

Staff has reviewed applicable geologic maps and reports for this area (Blake 2000a and b; CDMG 1990; CDMG 1994a and b; CDMG 1998; CDMG 1999; CDMG 2003; CGS 2002a, b and c; CGS 2007; Jennings and Saucedo 2002; Kleinfelder 2009; SCEDC 2008; USGS 2003; USGS 2008a and b). The proposed project is currently not used for mineral production, nor is it under claim, lease, or permit for the production of locatable, leasable, or salable minerals. Sand and gravel resources are present at the site and could potentially be a source of salable resources; however, such materials are present throughout the regional area such that the PSPP should not have a significant impact on the availability of such resources.

The proposed PSPP site is mapped as Mineral Resource Zone (MRZ)-4 (CDMG 1994a). Mineral Resource Zone-4 refers to "areas of no known mineral occurrences where geologic information does not rule out either the presence or absence of industrial mineral resources".

No economically viable mineral deposits are known to be present at the site (CDMG 1994a; Kohler 2006), and no mines are known to have existed within the proposed project boundaries (USGS 2008b). Many inactive mines and mineral prospects are hosted by metamorphic and intrusive basement rocks within 10 miles of the proposed project boundary, primarily in the Palen and Chuckwalla Mountains. These have produced a number of precious and base metals, including iron (magnetite) and pyrophyllite (CDMG 1994a). Minor gold, silver, copper and uranium prospects are located in the Palen Mountains northeast of the proposed project site. The Black Jack Mine in the northern McCoy Mountains about 16 miles northeast of the PSPP site is known for the most productive and most extensively worked manganese mine in the southern California. This manganese mine was active during war times and in the 1950s to produce several thousand tons of manganese. This area is within the Ironwood Manganese District of approximately 1.4-square-mile surface area. Other mining areas, including the Blue Bird Mine area, St. John Mine area, and George Mine area are also located in the northern McCoy Mountains and have produced manganese, copper, and a small amount of silver and gold in the past (CDMG 1994a). Uranium has been claimed in the southern McCoy Mountains about 22 miles east of the PSPP site with reported past production by Caproci-Woock Groups (CDMG 1968). There are several other prospective or claim areas for minerals in the McCoy Mountains including manganese, copper, silver, gold, and uranium (USGS 2009). The Roosevelt and Rainbow group of mines in the Mule Mountain district, also known as the Hodges Mountain district that is located about 26 miles southeast of the PSPP site, have produced some gold and copper from the quarts veins in granitic rocks (CDMG 1998).

The nearest oil and gas fields are located more than 150 miles west of PSPP site in the Los Angeles Sedimentary basin (CDC 2001). The nearest geothermal field is located at Brawley just south of the Salton Sea in the Imperial Valley basin about 40 miles southwest of PSPP site (CDC 2000; CDC 2001).

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

Paleontologic Resources

Staff has reviewed the paleontologic resources assessment in Section 5.9 of the AFC (Solar Millennium 2009a). Staff has also reviewed the paleontologic literature and records search conducted by NHMLA (McCleod, 2009); UCMP; and RCLIA (2009) for information regarding known fossil localities and stratigraphic unit sensitivity within the proposed project area. Site-specific information generated by the applicant for the PSPP was also reviewed (SWCA 2009).

Near-surface geology beneath the proposed PSPP site consists primarily of Quaternary alluvium, eolian and lacustrine sediments which increases in age with depth from Holocene at the surface to Pleistocene and older at depth (CDMG 1967;USGS 1989; USGS 1990; USGS 2006). Coarse-grained sediments grade laterally and are interbedded with lakebed deposits of similar ages. Pleistocene age older alluvium, which is exposed along the southwestern boundary of the site, underlies younger alluvium and lacustrine sediments. Older alluvium would likely be buried at progressively deeper depths beneath Holocene sediments to the northeast across the site.

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

The results of a site-specific comprehensive field survey recorded one non-significant fossil occurrence that yielded a non-diagnostic vertebrate material within the project limits (Solar Millennium 2009b). The specimen was discovered *ex-situ* (i.e. removed from its original place of fossilization) as a lag deposit transported an unknown distance and re-deposited on top of alluvial sediments (Solar Millennium 2009a). As a result, the fossil resource discovered on the surface within the limits of the project is not considered significant.

The Riverside County Transportation and Land Management Agency (TLMA) has produced a paleontological sensitivity map of the county (RCLIS 2009). The mapping indicates that areas underlain by playa lake, eolian and younger alluvial deposits within and around the Palen Dry Lake basin have a high paleontological sensitivity rating. Younger alluvium upslope from the lake bed has a low sensitivity rating, and older alluvium is assigned an undetermined sensitivity rating, according to the TLMA.

Based on the above information, the paleontological resource sensitivity of undisturbed Quaternary alluvium and lacustrine sediments varies from low at shallow depths to high at deeper depths. Since the depth to Pleistocene age sediments beneath Holocene deposits is unknown, staff concludes that all sediments beneath disturbed ground should initially be treated as highly sensitive. Where these units are mapped at the surface or may be present near the surface adjacent to these mapped areas, specifically along the northern and southern borders of the proposed PSPP site, paleontological monitoring should be conducted during any excavation activity. Since the depth to Pleistocene age alluvial and lacustrine deposits is undetermined at present for the remainder of the site, any excavations that penetrate below 1.5 feet of the existing ground surface should be treated as having a high potential for impacting significant paleontological resources and would require paleontological monitoring. This depth is based on observations of possible older alluvium encountered in excavations advanced for the geomorphic reconnaissance report (Solar Millennium 2009a). This depth would likely increase from the northern and southern boundaries towards the center of the proposed PSPP site. After monitoring of grading and trenching activities during

proposed construction of the site, a qualified professional paleontologist may determine the appropriate depth above which the coarse and fine grained soils are Holocene in age, have a low sensitivity, and low potential for adverse impacts on paleontological resources.

These conclusions are based on SVP criteria, the Paleontologic Resource Assessments in the AFC (Solar Millennium 2009a), and the independent records searches and paleontologic review provided by McLeod (2009), the UCMP (2009); and RCLIA (2009). Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate paleontologic resource impacts, as discussed above, to less than significant levels. These conditions would essentially require a worker education program in conjunction with the monitoring of earthwork activities by the PRS assigned to the project.

The proposed conditions of certification would allow the Energy Commission's CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

D.2.4.2.2 Construction Impacts and Mitigation

The design-level geotechnical evaluation, required for the project by the CBC (2007) and proposed Condition of Certification **GEO-1** should provide standard engineering design recommendations for mitigation of earthquake ground shaking; excessive settlement due to dynamic compaction and hydrocompaction; and potentially expansive soils.

Construction of the proposed project would directly remove approximately 5,200 acres from potential use for sand and gravel production under BLM's salable mineral program. In general, sand and gravel resources are widely available throughout the region. The primary consideration in the economic viability of sand and gravel operations is the transportation cost, which is driven by the proximity of the operation to its point of use. Although there is likely to be widespread development in the Chuckwalla Valley that would require sand and gravel resources, the proposed project site represents a small fraction of the total sand and gravel resource available within the valley such that removal of the 5,200-acre area from potential production is not expected to have any significant impact on potential future development. As a result, the PSPP would not impact any current or reasonably foreseeable development of geologic resources. However, during construction, the applicant may need or desire to move sand and gravel either off-site or between the different units of the facility. Should this occur, the applicant would be required to comply with BLM regulations in 43 CFR Part 3600, which regulates the production and use of sand and gravel from public lands. Use of sand and gravel or other mineral materials within the boundaries of an authorized ROW is permitted; however, removal of these materials from an authorized ROW would require payment to the United States of the fair market value of those materials.

The proposed project would not have any direct or indirect impact on the production of locatable or leasable minerals outside of the proposed project boundaries. Although mineral occurrences have been claimed in the vicinity of the PSPP site, there are no indications that these could become economic commercial operations. If they become economic operations, the existence of the proposed facility is not expected to interfere with the ability of the claimant to access those minerals. The only potential conflict

would occur if the claimant or another person locates a new claim, for locatable minerals underneath the proposed project, within the project boundaries. This could potentially occur, as the proposed project location has not been withdrawn from mineral entry. The potential for this scenario is expected to be low. If it did occur, conflicts between the surface use of the land for solar energy production and access to the subsurface minerals would be addressed in accordance with Federal and Riverside County land use regulations. Therefore, the PSPP would not impact any current or reasonably foreseeable development of mineral resources.

Significant paleontologic resources have been documented in the same or similar older alluvium deposits that are present in the general area of the project. Construction of the proposed project will include grading, foundation excavation, utility trenching and possibly drilled shafts. Staff considers the probability of encountering paleontologic resources to be generally high on portions of the site based on the soils profile, SVP assessment criteria, and the near surface occurrence of the sensitive geologic units. The potential for encountering fossils hosted in Quaternary alluvium will increase with the depth of cut. Excavations for ancillary facilities and new pipelines and on-site excavations that penetrate surficial Holocene age alluvium will have a higher probability of encountering potentially high sensitivity materials, although sensitive materials could occur nearer the surface. The proposed mitigation cannot avoid or reduce fossil disturbance associated with drilled shaft foundations; however, the volume of disturbance and probability of encountering fossil resources would be low in comparison to the grading and excavation activities. For these reasons, there would still be a net gain to the science of paleontology.

Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate any paleontologic resource impacts, as discussed above, to a less than significant level. Essentially, Conditions of Certification **PAL-1** to **PAL-7** would require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (PRS). Earthwork would be halted any time potential fossils are recognized by either the paleontologist or the worker. For finds deemed significant by the PRS, earthwork cannot restart until all fossils in that strata, including those below the design depth of excavation, are collected. When properly implemented, the conditions of certification would yield a net gain to the science of paleontology since fossils that would not otherwise have been discovered can be collected, identified, studied, and properly curated. A PRS would be retained, for the project by the applicant, to produce a monitoring and mitigation plan, conduct the worker training, and oversee the monitoring.

During the monitoring, the PRS can and often does petition the Energy Commission for a change in the monitoring protocol. Most commonly, this is a request for less monitoring after sufficient monitoring has been performed to ascertain that there is little chance of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or in response to repeated out-of-compliance incidents by the earthwork contractor. In the case of the PSPP site, the PRS would determine an appropriate depth above which undisturbed alluvial deposits are Holocene in age, have a low paleontologic sensitivity, and have little chance of containing significant fossils. The PRS could then recommend decreased monitoring for excavations above that depth. Paleontologic sensitivity of Pleistocene age sediments below the determined depth would remain high and would require continued monitoring.

Based upon the literature and archives search, field surveys, and compliance documentation for the proposed PSPP, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the project. Staff agrees with the applicant that the facility can be designed and constructed to minimize the effect of geologic hazards and impacts to potential paleontologic resources at the site during project design life.

D.2.4.2.3 Operation Impacts and Mitigation

Operation of the proposed new solar energy generating facility should not have any adverse impact on geologic, mineralogic, or paleontologic resources because significant additional ground disturbance would not occur. Since the CBC requires that the facility be designed to withstand strong ground shaking, impacts due to seismic events should not significantly impact the structural integrity or operation of the facility

D.2.4.2.4 Project Closure and Decommissioning

The future decommissioning and closure of the project should not negatively affect geologic, mineralogic, or paleontologic resources since the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the project.

D.2.4.3 CEQA LEVEL OF SIGNIFICANCE

California Environmental Quality Act guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Title 14 CCR §15126.4[a][1]). Appendix F of the guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce the wasteful, inefficient, and unnecessary consumption of energy (Title 14, CCR §15000 et seq., Appendix F).

Energy use, production, and efficiency are addressed in other sections of this document. Energy/efficiency factors affect geologic hazards and geologic, mineralogic, and/or paleontologic resources only when energy/efficiency concerns require changes to the size or location of the construction zone, as addressed below.

D.2.5 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

This alternative is analyzed because

1. It would retain the 500 MW generation capacity defined for the proposed project and the engineering is defined by Solar Millennium as feasible;
2. It reduces impacts to the primary and secondary desert washes that cross the proposed site; and

3. It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

D.2.5.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the Solar Millennium Palen ROW application area but the alternative would remain entirely within BLM managed lands.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. The geologic units present in the Reconfigured Alternative are the same as for the Proposed Project.

D.2.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Because the geologic units that would be disturbed by the Reconfigured Alternative are the same as those that would be disturbed by the Proposed Project, potential impacts to geologic, mineralogic and paleontologic resources would be the same as for the Proposed Project. Potential impacts to the facility from geologic hazards would also remain the same as for the Proposed Project. Therefore, no changes to the levels of significance, beyond those discussed for the Proposed Project, would be anticipated and no changes to the proposed conditions of certification would be required.

D.2.5.3 CEQA LEVEL OF SIGNIFICANCE

Because the geologic units that would be disturbed by the Reconfigured Alternative are the same as those that would be disturbed by the Proposed Project, and since potential geologic hazards would remain the same, the CEQA Level of Significance would remain unchanged from that described for the Proposed Project. Since this alternative would reduce the overall project footprint and eliminate some of the footprint from some sensitive areas, the overall impact to potential resources would be reduced.

D.2.6 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;

- It would reduce impacts to the sand transport corridor.

D.2.6.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be similar to the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

D.2.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Because the geologic units that would be disturbed by Reconfigured Alternative #2 are the same as those that would be disturbed by the Proposed Project, potential impacts to geologic, mineralogic and paleontologic resources would be the same as for the Proposed Project. Potential impacts to the facility from geologic hazards would also remain the same as for the Proposed Project. Therefore, no changes to the levels of significance, beyond those discussed for the Proposed Project, would be anticipated and no changes to the proposed conditions of certification would be required.

D.2.6.3 CEQA LEVEL OF SIGNIFICANCE

Because the geologic units that would be disturbed by Reconfigured Alternative #2 are the same as those that would be disturbed by the Proposed Project, and since potential geologic hazards would remain the same, the CEQA Level of Significance would remain unchanged from that described for the Proposed Project.

D.2.7 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;

- It would reduce impacts to the sand transport corridor.

D.2.7.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern half of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located primarily on public land managed by BLM; however, as with the proposed project, it includes a 40 acre private parcel on which the applicant has a purchase option. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

D.2.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Because the geologic units that would be disturbed by Reconfigured Alternative #3 are the same as those that would be disturbed by the Proposed Project, potential impacts to geologic, mineralogic and paleontologic resources would be the same as for the Proposed Project. Potential impacts to the facility from geologic hazards would also remain the same as for the Proposed Project. Therefore, no changes to the levels of significance, beyond those discussed for the Proposed Project, would be anticipated and no changes to the proposed conditions of certification would be required.

D.2.7.3 CEQA LEVEL OF SIGNIFICANCE

Because the geologic units that would be disturbed by Reconfigured Alternative #3 are the same as those that would be disturbed by the Proposed Project, and since potential geologic hazards would remain the same, the CEQA Level of Significance would remain unchanged from that described for the Proposed Project.

D.2.8 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be approximately 25% smaller, occupying about 2080 acres of land (as compared with 3,873 acres required for the proposed project). Additional acreage would be required for the Reduced Acreage Alternative for the transmission line alignment, access road, telecom route, and construction water supply. The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**. The Reduced Acreage Alternative would result in an approximately 375 MW project.

This alternative is analyzed for several reasons:

1. It would eliminate about 25% of the proposed project area so all impacts would be reduced;
2. It would reduce impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley aeolian sand corridor, and the Mojave Fringe-Toed Lizard by

prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields;

3. It would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 2; and
4. It would reduce impacts to primary and secondary desert washes crossing the proposed site.

D.2.8.1 SETTING AND EXISTING CONDITIONS

The Reduced Acreage Alternative would incorporate the following changes from the Reconfiguration Alternative:

- It would modify the boundaries of Unit 1 as follows:
- Preclude the use of the northeastern quarter of the westernmost solar field
- It would reduce and revise the easternmost solar field to avoid the dune habitat
- It would result in approximately 803 acres or approximately 55% of the Reconfigured Alternative Unit 1 (1,467 acres)
- It would modify the boundaries of Unit 2 as follows:
- Eliminate the southernmost segment of Unit 2 (170 acres within Desert Tortoise Critical Habitat)
- Eliminate the northernmost area of Unit 2 (260 acres of dune sands and MFTL habitat)
- Add 215 acres to the western end of the second and third rows of solar trough loops to make up for some of the reductions described above.

As such, the geologic units impacted by the Reduced Acreage Alternative are similar to those that would be impacted by the Proposed Project.

D.2.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Because the ground disturbance from the Reduced Acreage Alternative will be less than that associated with the Proposed Project, potential impacts to geologic, mineralogic and paleontologic resources would be correspondingly reduced, while potential impacts to the facility from geologic hazards would remain the same as for the Proposed Project. Therefore, no changes to the levels of significance, beyond those discussed for the Proposed Project, would be anticipated and no changes to the proposed conditions of certification would be required.

D.2.8.3 CEQA LEVEL OF SIGNIFICANCE

Because the geologic units that would be disturbed by the Reduced Acreage Alternative are the same as those that would be disturbed by the Proposed Project, and since potential geologic hazards would remain the same, the CEQA Level of Significance would remain unchanged from that described for the Proposed Project. Since this alternative would reduce the overall project footprint and eliminate some of the footprint from some sensitive areas, the overall impact to potential resources would be reduced.

D.2.9 NO PROJECT/NO ACTION ALTERNATIVE

D.2.9.1 1: NO ACTION ON PALEN SOLAR POWER PROJECT APPLICATION AND ON CDCA LAND USE PLAN AMENDMENT

The No Project Alternative under CEQA or the No Action Alternative under NEPA defines the scenario that would exist if the proposed PSPP were not constructed. The CEQA Guidelines state that "the purpose of describing and analyzing a 'no project' alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. 14 §15126.6(i)). The No Project analysis in this SA/EIR considers existing conditions and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (Cal. Code Regs, tit. 14 §15126.6(e)(2)). Under NEPA, the No Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives.

If the No Project/No Action Alternative were selected, the construction and operational impacts of the PSPP would not occur. There would be no grading of the site, no loss of resources or disturbance of approximately 5,000 acres of desert habitat, no impacts to cultural resources, and no installation of power generation and transmission equipment. The No Project/No Action Alternative would also eliminate contributions to cumulative impacts on a number of resources and environmental parameters in Riverside County and in the Colorado Desert as a whole.

In the absence of the PSPP, however, other power plants, both renewable and non-renewable, would have to be constructed to serve the demand for electricity and to meet RPS. If the No Project/No Action Alternative were chosen, other utility-scale solar power facilities may be built, and the impacts to the environment may be similar to those of the proposed project because these technologies require large amounts of land like that required for the PSPP. The No Project/No Action Alternative may also lead to siting of other non-solar renewable technologies to help achieve the California RPS.

Additionally, if the No Project/No Action 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 proposed project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide, and Southern California Edison Company (SCE) would not receive the 500 MW contribution to its renewable state-mandated energy portfolio. Impacts to other facilities from geologic hazards (i.e. ground shaking, dynamic compaction, etc.) would be similar.

Paleontologic resources have been documented in the general area of the project. As the value of paleontologic resources is predicated on their discovery within a specific geologic host unit, construction of the project could result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved. The No Project/No Action Alternative would preclude this potential net gain.

D.2.9.2 2: NO ACTION ON PALEN SOLAR POWER PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA AVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed PSPP would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, impacts related to geology, minerals, and paleontology would result from the construction and operation of the solar technology and would likely be similar to the impacts from the proposed project. Different solar technologies require different amounts of grading and maintenance; however, it is expected that all the technologies would require some grading and maintenance. As such, this No Project/No Action Alternative could result in impacts and benefits related to geology, minerals, and paleontology similar to the impacts under the proposed project. Impacts to other facilities from geologic hazards (i.e. ground shaking, dynamic compaction, etc.) would be similar.

D.2.9.3 3: NO ACTION ON PALEN SOLAR POWER PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA UNAVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed PSPP would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the geologic conditions of the site are not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in impacts to geologic features, minerals, or paleontologic resources, nor would it result in the potential benefits of additional knowledge about local paleontologic resources that could occur during construction of the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

D.2.10 PROJECT-RELATED FUTURE ACTIONS – GEOLOGY, PALEONTOLOGY AND MINERALS

In order to transmit the power generated at the PSPP to the electricity grid, a new substation is required. The SCE will construct and operate the substation, which will

allow the electricity to be carried by the Devers-Palo Verde No. 1 (DPV1) 500 kV transmission line.

The SCE Red Bluff Substation is a reasonably foreseeable project if the PSPP is approved and constructed as proposed. Therefore, this section examines the potential impacts of the construction and operation of the proposed substation. This substation would allow interconnection of the PSPP and other renewable projects in the Desert Center area.

The SCE Red Bluff Substation project will be fully evaluated in a future EIS prepared by the BLM. Because detailed design information is not yet available for the Red Bluff Substation, the impact analysis presented here is based on available information. The purpose of this analysis is to inform the Energy Commission and BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the PSPP.

The project components and construction activities associated with this substation are described in Section B.3 of this Revised Staff Assessment (RSA), and a map of its location is presented as **Figure B.3-1**. This analysis examines the construction and operational impacts of a 230/500 kV substation that would be located on approximately 90 acres, south of Interstate 10 and southeast of Desert Center. Substation components will include 230 kV and 500 kV lines, 230/ 500 kV transformer banks, associated switchracks, and a microwave tower. The substation would be located in an existing CDCA utility corridor, north of and adjacent to the existing DPV1 500 kV transmission line.

D.2.10.1 ENVIRONMENTAL SETTING

The regional setting for the geological and paleontological resources in the Chuckwalla Valley is presented in the environmental setting above (**Section D.2.4**). The substation site is primarily located within an alluvial plain, on Recent Alluvium (Qal) which is defined as unconsolidated alluvial fan, river channel, and stream deposits consisting of silt, sand, clay, and gravel (CPUC 2006). The primary soil association at the substation site is Cherioni-Hyder-Cipriano (CA928) which has a high corrosion potential to uncoated steel and a low corrosion potential to concrete (CPUC 2006). No mineral resources have been identified in the area and there are no known active fault crossings at the location (CPUC 2006). The Chuckwalla Valley is underlain by Quaternary sediments and small areas of bedrock. Ground water elevations in this region are very deep and are expected to be greater than 100 feet along most of the alignment, thus liquefaction is not likely even in the areas vulnerable to moderate ground shaking.

The Red Bluff Substation region is considered to have either a Low or Undetermined paleontologic sensitivity (Riverside County 2003).

D.2.10.2 ENVIRONMENTAL IMPACTS

Soil testing should be conducted and analyzed by a professional, licensed Geotechnical Engineer or Geologist, to determine existing soil conditions. Borings in a sufficient quantity to adequately gather variations in the site soils should be conducted to remove sample cores for testing. The type of soils, soil pressure, relative compaction, resistively and percolation factor are among the items that should be tested. Soils in the Chuckwalla

Valley region have a high potential to corrode steel and a low to moderate potential to corrode concrete. Expansion potential for the soils along the segment is low. The results of the geotechnical investigation would then be applied to the project's engineering design and construction practices and this would ensure that potential impacts associated with problematic soils and slope instability are reduced to less than significant levels. Excavation and grading for structure foundations, work areas, access roads, and spur roads could loosen soil and accelerate erosion.

There are no known active faults crossing the proposed route and the area is considered to have a low potential for seismic hazard. Therefore, there would not likely be any impacts related to fault rupture, liquefaction, strong ground shaking, or earthquake-induced landslides. The structures would be constructed to comply with all applicable LORS.

Construction of the substation could also destroy or disturb significant paleontologic resources located within the project area with construction-related ground disturbances, such as the building or improvement of access roads, excavating, grading, and vegetation removal.

D.2.10.3 MITIGATION

Implementation of mitigation measures presented for protection of soil and water resources (**Section C.6**) would reduce the amount of erosion that would result from construction. In addition, compliance with a Storm Water Pollution Prevention Plan (SWPPP) would limit erosion from the construction site. If desert pavement is located along the proposed route, mitigation would be recommended to protect desert pavement through avoidance or use of temporary mats. With implementation of measures and best management practices that would ensure proper re-vegetation, erosion control, and drainage, among other requirements, the proposed SCE Red Bluff Substation would not result in significant impacts to geology and minerals.

Potentially significant impacts to paleontologic resources may exist at the Red Bluff Substation site. Mitigation should provide for a paleontologic resources inventory after final project design, pre-construction planning for monitoring and treatment of paleontologic resources, and for monitoring during construction. The mitigation should require a qualified paleontologic monitor and qualified paleontologist to monitor for significant subsurface fossils and then collect, analyze and curate any significant fossils found. Implementation of this suggested paleontologic mitigation would reduce project impacts to paleontologic resources to a less than significant level.

D.2.10.4 CONCLUSION

The SCE would comply with applicable LORS as related to the Red Bluff Substation project. No significant geologic or mineral resources have been identified in the project area; however, technical investigations/surveys have not yet been performed. The upgraded lines and substation equipment would be designed and constructed in accordance with the seismic requirements of SCE's Construction Standards and CPUC General Order 95. The project would have no adverse impact with respect to geologic and paleontologic resources if it implements the recommended mitigation and complies with applicable LORS.

D.2.11 CUMULATIVE IMPACTS

Section B.3, Cumulative Scenario, provides detailed information on the potential cumulative solar and other development projects in the project area. Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed project. In summary, these projects are:

- Renewable energy projects on BLM, State, and private lands, as shown on **Cumulative Scenario Figure 1** and in **Cumulative Scenario Tables 1A and 1B**. Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable projects currently proposed in California.
- Foreseeable future projects in the Chuckwalla Valley area, as shown on **Cumulative Scenario Figure 2**, I-10 Corridor Existing and Future/Foreseeable Projects, and **Cumulative Scenario Tables 2 and 3**. **Table 2** presents existing projects in this area and **Table 3** presents future foreseeable projects in the I-10 Corridor Area. Both tables indicate project name and project type, its location and its status.

These projects are defined within a geographic area that has been identified by the Energy Commission and BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under CEQA and/or NEPA. Even if the cumulative projects described in Section B.3 have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this RSA.

D.2.11.1 GEOGRAPHIC SCOPE OF ANALYSIS

The geographic extent of potential impact to geologic, mineralogic, and paleontologic resources would be generally limited to the PSPP site. Potential cumulative effects, as they pertain to geologic hazards, are essentially limited to regional subsidence due to ground water withdrawal. Impacts associated with strong ground shaking and dynamic compaction are not cumulative in nature and would not add to potential cumulative impacts to the facility.

D.2.11.2 EFFECTS OF PAST AND PRESENT PROJECTS

Historic ground water withdrawals on the order of 48,000 ac-ft/yr and associated impacts to ground water levels did not result in any documented subsidence in the proposed project area even with increases in effective stress on clay layers present at depth. The proposed PSPP would result in increased annual ground water pumping, from the current 2,000 ac-ft/yr to approximately 2,300 ac-ft/yr, which is not expected to significantly affect regional subsidence in the geographic area. Additional information is contained in the **SOIL AND WATER RESOURCES SECTION C.6.**

Paleontologic resources have been documented in the general area of the project. As the value of paleontologic resources is associated with their discovery within a specific geologic host unit, the potential impacts to paleontologic resources due to construction activities will be mitigated as required by proposed Conditions of Certification **PAL-1** through **PAL-7**. Implementation of these conditions should result in a net gain to the

science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved. Cumulative impacts, in consideration with other nearby similar projects, should be either neutral (no fossils encountered) or positive (fossils encountered, preserved, and identified). Construction associated with past and present projects could add to fossil discoveries which would enhance our understanding of the prehistoric climate, geology, and geographic setting of the region for the benefit of current and future generations.

D.2.11.3 EFFECTS OF REASONABLY FORESEEABLE FUTURE PROJECTS

D.2.11.3.1 Foreseeable Projects in the Project Area

Several future foreseeable projects identified in **Cumulative Scenario Tables 2 and 3 (Section B.3)** are located within the Chuckwalla Valley. Such projects would most likely include ground water pumping of similar magnitude to the PSPP; however, the combined effect of these projects would still result in much less than the historic rate of 48,000 ac-ft/yr, which did not result in any documented regional subsidence, such that significant impacts to regional subsidence would not be expected. Therefore, there would be no significant cumulative contribution to regional subsidence from foreseeable renewable projects in the Chuckwalla Valley. Additional information on ground water withdrawal is contained in the **Soil and Water Resources Section C.6**.

D.2.11.3.2 Foreseeable Renewable Projects in the California Desert

Several future foreseeable renewable projects in the California Desert, as shown in **Cumulative Scenario Tables 1A** and **1B**, would be located within the Chuckwalla Valley. Such projects would most likely include ground water pumping of similar magnitude to the PSPP; however, the combined effect of these projects would still result in much less than the historic rate of 48,000 ac-ft/yr, which did not result in any documented regional subsidence, such that significant impacts to regional subsidence would not be expected. Therefore, there would be no significant cumulative contribution to regional subsidence from foreseeable renewable projects in the California Desert. Additional information on ground water withdrawal is contained in the **Soil and Water Resources Section C.6**.

D.2.11.3.3 Contribution of the Palen Solar Power Project to Cumulative Analysis

Construction

The construction of the PSPP is not expected to require any significant amount of ground water pumping such that impacts to regional subsidence are not expected.

Sand and gravel resources are present at the site and could be used during construction to minimize importation of such materials from other commercially available sources in the area, thereby minimizing impacts to current commercially available sand and gravel resources. In addition, sand and gravel resources are present throughout the regional area. Therefore, construction of the PSPP would not impact any reasonably foreseeable development of sand and gravel resources.

The construction of the PSPP would include excavation and grading at the site. Proper monitoring of excavations at the proposed PSPP facility during construction could result in fossil discoveries, which would enhance our understanding of the prehistoric climate, geology, and geographic setting of the region for the benefit of current and future generations.

Operation

The operation of the PSPP is expected to result in increased annual ground water pumping, from the current 2,000 ac-ft/yr to approximately 2,300 ac-ft/yr. Historic ground water withdrawals on the order of 48,000 ac-ft/yr did not result in any documented subsidence in the proposed project area. Since operation of the PSPP would only contribute a minor amount of additional ground water withdrawal to the overall amount in the Chuckwalla Valley and since this cumulative amount is only a fraction of historic pumping levels that did not result in any documented subsidence, operation of the PSPP is not expected to impact regional subsidence in the Chuckwalla Valley.

Operation of the PSPP is not expected to require any significant excavation or grading such that impacts to geologic, mineralogic, and paleontologic resources are expected.

Decommissioning

The decommissioning of the PSPP is not expected to require any significant amount of ground water pumping such that impacts to regional subsidence are not expected. In addition, potential sand and gravel resources would become available again following decommissioning of the project.

Decommissioning of the PSPP would include excavation and grading at the site. Proper monitoring of excavations at the proposed PSPP facility during decommissioning could result in fossil discoveries, which would enhance our understanding of the prehistoric climate, geology, and geographic setting of the region for the benefit of current and future generations.

As a result, decommissioning of the PSPP would not contribute to cumulative impacts to geologic, mineralogic, and paleontologic resources, but rather would make existing sand and gravel resources available, and would allow for potential procurement of paleontologic resources that would otherwise remain unknown.

D.2.11.4 OVERALL CONCLUSION

The amount of ground water withdrawal proposed for the PSPP is only a fraction of historic withdrawals and therefore, the proposed PSPP would not significantly contribute to any increase of this potential hazard. In addition, a significant number of large-scale ground water pumping operations would have to be constructed to have any measurable impact on the proposed facility.

Based on the above discussion, staff believes that the potential for significant adverse cumulative impacts to the proposed project from geologic hazards during the project's design life is negligible and that the potential for impacts to geologic, mineralogic, and paleontologic resources is very low.

Based upon the literature and archives search, field surveys, and compliance documentation for the submitted PSPP, the applicant proposes monitoring and mitigation measures for construction of the proposed project, and staff agrees with the applicant that the project can be designed and constructed to minimize the effects of geologic hazards at the site and that impacts to fossils encountered during construction would be mitigated to levels of insignificance.

The proposed conditions of certification allow the Energy Commission's CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geologic hazards and geologic, mineralogic, and paleontologic resources.

D.2.12 COMPLIANCE WITH LORS

Federal, state, or local/county laws, ordinances, regulations, and standards applicable to this project or alternatives, other than the No Action alternative, were detailed in **Geology and Paleontology Table 1**. Staff anticipates that the project would be able to comply with applicable LORS.

D.2.13 NOTEWORTHY PUBLIC BENEFITS

The science of paleontology is advanced by the discovery, study and curation of new fossils. These fossils can be significant if they represent a new species, verify a known species in a new location and/or if they include parts of similar specimens that had not previously been found preserved. In general, most fossil discoveries are the result of excavations, either purposeful in known or suspected fossil localities or as the result of excavations made during earthwork for civil improvements or mineral extraction. Proper monitoring of excavations at the proposed PSPP facility, in accordance with an approved Paleontological Monitoring and Mitigation Plan, could result in fossil discoveries which would enhance our understanding of the prehistoric fossil record, or the climate, geology, and geographic setting of the region for the benefit of current and future generations.

D.2.14 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

The proposed PSPP is situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by the CBC (2007). Settlement due to hydrocompaction or dynamic compaction, as well as impacts caused by expansive soils and corrosive soils, must be mitigated in accordance with a design-level geotechnical investigation as required by the CBC (2007), proposed Condition of Certification **GEO-1**, and proposed Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** under **Facility Design**. Paleontologic resources have been documented in the general area of the project and in materials similar to those that are present at the site. The potential impacts to paleontologic resources due to construction activities will be mitigated as required by proposed Conditions of Certification **PAL-1** to **PAL-7**.

The proposed conditions of certification allow the Energy Commission CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geologic hazards and geologic, mineralogic, and paleontologic resources.

GEO-1 The Soils Engineering Report required by Section 1802A of the 2007 CBC should specifically include laboratory test data, associated geotechnical engineering analyses, and a thorough discussion of potential hydrocompaction or dynamic compaction; the presence of expansive clay soils; and the presence of corrosive soils. The report should 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, ground water 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 are to be provided to the CPM at least 30 days prior to grading.

PAL-1 The project owner shall provide the compliance project manager (CPM) with the resume and qualifications of its paleontological resource specialist (PRS) 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 CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified paleontological resource monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by 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 to monitor as he or she deems necessary on the project. Paleontologic resource monitors (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 a resume and statement of availability of its designated PRS for on-site work.

(2) At least 20 days prior to 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 the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the 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 the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, 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 and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale between 1 inch = 40 feet and 1 inch = 100 feet. If the footprint of the project or its linear facilities changes, the project owner shall provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Before work commences on affected phases, the project owner shall notify the PRS and 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, the project owner shall provide the maps and drawings to the PRS and CPM.

(2) If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

(3) If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to 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 significant paleontological resources. Approval of the PRMMP by 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 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, 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 of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;
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 significant 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 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 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 CPM-approved training for the following workers: project managers, construction supervisors, foremen, and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial in-person PRS training or may utilize a CPM-approved video or other presentation format during the project kick off for those mentioned above. Following initial training, a CPM-approved video or other approved training presentation/materials, 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 areas of interest or concern. No ground disturbance shall occur prior to 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 paleontologic 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 ground disturbance, the project owner shall submit 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 training program presentation/materials to the CPM for approval if the project owner is planning to use a presentation format other than an in-person trainer for training.

(3) If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to 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 other approved format) 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 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 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 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 the CPM at any time.

3. The project owner shall ensure that the PRS notifies 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 significant paleontological resources encountered, either the project owner or the PRS shall notify 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 paleontologic monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by 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, 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 significant 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 the CPM-approved paleontological resource report (see Condition of Certification **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 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 CPM.

D.2.15 CONCLUSIONS

The applicant should easily be able to comply with applicable LORS, provided that the proposed conditions of certification are implemented and followed. The design and construction of the project should have no adverse impact with respect to geologic, mineralogic, and paleontologic resources. Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed conditions of certification listed above.

Certification of Completion
Worker Environmental Awareness Program
Palen Solar Power Project (09-AFC-7)

This is to certify these individuals have completed a mandatory California Energy Commission–approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
1.			
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25.			

Cultural Trainer: _____ Signature: _____ Date: _/__/___

Paleo Trainer: _____ Signature: _____ Date: _/__/___

Biological Trainer: _____ Signature: _____ Date: _/__/___

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D.3 – POWER PLANT EFFICIENCY

Testimony of Erin Bright

D.3.1 SUMMARY OF CONCLUSIONS

The Palen Solar Power Project, if constructed and operated as proposed, would use solar energy to generate most of its capacity. Fossil fuel, in the form of propane, would be used only to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point. Compared to the project's expected overall production rate of approximately 1,000 GWH per year, and compared to a typical fossil fuel-fired power plant of equal capacity, the amount of the annual power production from fossil fuel is insignificant.

The project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. It would not create significant adverse effects on fossil fuel energy supplies or resources, would not require additional sources of energy supply, and would not consume fossil fuel energy in a wasteful of inefficient manner. No efficiency standards apply to this project. Staff therefore concludes that this project would present no significant adverse impacts on fossil fuel energy resources.

The Palen Solar Power Project, if constructed and operated as proposed, would occupy approximately 6 acres per MW of power output, a figure nearly one third less than that of some other solar power technologies.

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

D.3.2 INTRODUCTION

The Palen Solar Power Project (PSPP or proposed project), if constructed and operated as proposed, would generate 500 megawatts (MW) (nominal net output) of electricity. PSPP would be a solar thermal power plant built on an approximately 3,000–acre site in Riverside County, California. The project would use the concentrated parabolic trough solar thermal technology to produce electrical power using steam turbine generators fed from solar steam generators. Fossil fuel, in the form of propane, would be used to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point.

D.3.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

FOSSIL FUEL USE EFFICIENCY

One of the responsibilities of the Energy Commission is to make findings on whether the energy use by a power plant, including the proposed PSPP, would result in significant

adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the proposed project's energy consumption creates a significant adverse impact, it must further determine if feasible mitigation measures could eliminate or minimize that impact. In this analysis, staff addresses the inefficient and unnecessary consumption of energy.

In order to develop the Energy Commission's findings, this analysis will:

- examine whether the facility would likely present any adverse impacts upon energy resources;
- examine whether these adverse impacts are significant; and if so,
- examine whether feasible mitigation measures or alternatives could eliminate those adverse impacts or reduce them to a level of insignificance.

Solar Land Use Efficiency

Solar thermal power plants typically consume much less fossil fuel (usually in the form of natural gas) than other types of thermal power plants. Therefore, common measures of power plant efficiency such as those described above are less meaningful. So far as Energy Commission staff can determine, methods for determining the efficiency of a solar power plant have yet to be standardized; research has uncovered no meaningful attempt to quantify efficiency. The solar power industry appears to have begun discussing the issue, but a consensus is forthcoming (CEC 2008j). In the absence of accepted standards, staff proposes the following approach.

Solar thermal power plants convert the sun's energy into electricity in three basic steps:

- Mirrors and/or collectors capture the sun's rays.
- This solar energy is converted into heat.
- This heat is converted into electricity, typically in a heat engine such as a steam turbine generator or a Stirling Engine-powered generator.

The effectiveness of each of these steps depends on the specific technology employed; the product of these three steps determines the power plant's overall solar efficiency. The greater the project's solar efficiency, the less land the plant must occupy to produce a given power output.

The most significant environmental impacts caused by solar power plants result from occupying large expanses of land. The extent of these impacts is likely in direct proportion to the number of acres affected. For this reason, staff will evaluate the land use efficiency of proposed solar power plant projects. This efficiency will be expressed in terms of power produced, or MW per acre, and in terms of energy produced, or MW-hours per acre-year. Specifically:

- Power-based solar land use efficiency is calculated by dividing the maximum net power output in MW by the total number of acres impacted by the power plant, including roads and electrical switchyards and substations.
- Energy-based solar land use efficiency is calculated by dividing the annual net electrical energy production in MW-hours per year by the total number of acres

impacted by the power plant. Since different solar technologies consume differing quantities of natural gas for morning warm-up, cloudy weather output leveling and heat transfer fluid freeze protection (and some consume no gas at all), this effect is be accounted for. Specifically, gas consumption is backed out by reducing the plant's net energy output by the amount of energy that could have been produced by consuming the project's annual gas consumption in a modern combined cycle power plant. (See **Efficiency Appendix A**, immediately following.) This reduced energy output is then be divided by acres impacted.

D.3.4 PROPOSED PROJECT

D.3.4.1 SETTING AND EXISTING CONDITIONS

The applicant proposes to build and operate PSPP, a solar thermal power plant producing a total of 500MW (nominal net output) and employing the concentrated parabolic trough solar thermal technology. The project would consist of two units, each comprised of arrays of parabolic mirrors, solar steam generator heat exchangers, one steam turbine generator, and an air cooled condenser (Solar Millennium 2009a, AFC §§2.1, 2.5).

The project's power cycle would be based on a steam cycle (also known as the Rankine cycle) (Solar Millennium 2009a, AFC §2.5.2).The solar steam generator heat exchangers would receive heated heat transfer fluid from the solar thermal equipment comprised of arrays of parabolic mirrors that collect energy from the sun. The heated heat transfer fluid would be used to generate steam in the heat exchangers. This steam would then expand through the steam turbine generators to produce electrical power.

The project would utilize two natural gas-fired auxiliary boilers, one per unit, to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point (54 degrees Fahrenheit [°F]). Except during startup, the project would not use fossil fuel to generate electricity.

D.3.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Project Energy Requirements and Energy Use Efficiency

PSPP would consume insignificant amounts of fossil fuel for power generation. It would consume fossil fuel only to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point.

The project would burn propane at a nominal rate of approximately 100,000 Million British Thermal Units (MMBTU) per year (Solar Millennium 2009b, DA-PPE-1). Compared to a typical fossil fuel-fired power plant of equal capacity, and compared to the relatively considerable resources of fossil fuel in California (see below in **Adverse Effects on Energy Supplies and Resources**), this rate is not significant. Propane is a relatively efficient form of fossil fuel, more efficient than natural gas and fuel oil.

The applicant estimates an average overall steam cycle efficiency of 35% for the proposed project (Solar Millennium 2009a, AFC Figure 2-7). There are currently no

legal or industry standards for measuring the efficiency of solar thermal power plants (CEC 2008d). Therefore, staff compares the steam cycle efficiency of PSPP to the average efficiency of the typical modern steam turbines currently available in the market. The efficiency figures for these turbines range from 35% to 40%. The project's thermal efficiency of 35% is comparable to this industry figure.

Therefore, staff considers the impact of the project's fuel consumption on energy supplies and energy efficiency to be less than significant.

Adverse Effects on Energy Supplies and Resources

The applicant has described its sources of propane for the project (Solar Millennium 2009a, AFC §2.5.5.1). Propane is normally created as a by-product of petroleum refining and from natural gas production. Petroleum products and natural gas (with California's access to natural gas resources from the Rocky Mountains, Canada and the southwest) represent considerable energy resources in California. Propane supplies in California amount to approximately 630 million gallons per year from refineries alone. This is only about 60% of California's total propane supply. Compared to this figure, the 1.13-million gallons (100,000 MMBtu) per year needed for PSPP is not significant (Solar Millennium 2009b, DA-PPE-1). Therefore, it appears highly unlikely that the project would create a substantial increase in fossil fuel demand.

Additional Energy Supply Requirements

There appears to be no real likelihood that PSPP would require the development of additional energy supply capacity (see above in **Adverse Effects on Energy Supplies and Resources**).

Compliance with Energy Standards

No standards apply to the efficiency of PSPP or other non-cogeneration projects.

Alternatives to Reduce Wasteful, Inefficient, and Unnecessary Energy Consumption

Staff typically evaluates the project alternatives to determine if alternatives exist that could reduce the project's fuel use. The evaluation of alternatives to the project (that could reduce wasteful, inefficient, or unnecessary energy consumption) requires the examination of the project's energy consumption.

Efficiency of Alternatives to the Project

Please see the project alternatives discussed below.

Alternative Generating Technologies

Alternative generating technologies for PSPP are considered in the AFC (Solar Millennium 2009a, AFC § 4.10). For purposes of this analysis, natural gas, oil, coal, nuclear, geothermal, biomass, hydroelectric, wind and solar photovoltaic technologies were all considered. Because this project would consume insignificant amounts of fossil fuel for power production (only during startup), staff believes that the proposed project would not constitute a significant adverse impact on fossil fuel energy resources compared to feasible alternatives.

The solar insolation falling on the earth's surface can be regarded as an energy resource. Since this energy is inexhaustible, its consumption does not present the concerns inherent in fossil fuel consumption. What is of concern, however, is the extent of land area required to capture this solar energy and convert it to electricity. Setting aside hundreds or thousands of acres of land for solar power generation removes it from alternative uses.

As discussed above, Energy Commission staff is unaware of any accepted standard for evaluating the efficiency of a solar power plant such as PSPP. Accordingly, staff proposes to tabulate the land use efficiency of the project (described above) and compare it to similar measures for other solar power plant projects that have passed through, or are passing through, the Energy Commission's siting process.

Energy Commission staff proposes to compare the land use of a solar power plant project to that of other solar projects in the Energy Commission's siting process. It has not been determined how great a difference in land use would constitute a significant difference; staff proposes to compare four solar projects currently in the process.

As this is written, there are currently four solar power plant projects that have progressed significantly through the Energy Commission siting process. These projects' power and energy output, and the extent of the land occupied by them, are summarized in **Efficiency Table 1**, below. The solar land use efficiency for a typical natural gas-fired combined cycle power plant is shown only for comparison.

A solar power project that occupies more land than another project holds the potential to produce more environmental impacts. PSPP would produce power at the rate of 500 MW net, and would generate energy at the rate of 1,000,000 MW-hours net per year, while occupying 2,970 acres (Solar Millennium 2009a, AFC §§2.0, 2.1, 2.2.1).

Staff calculates power-based land use efficiency thus:

Power-based efficiency: 500 MW ÷ 2,970 acres = **0.17 MW/acre** or **6.0 acres/MW**

Staff calculates energy-based land use efficiency thus:

Energy-based efficiency: 1,000,000 MWh/year ÷ 2,970 acres = **337 MWh/acre-year**

As seen in **Efficiency Table 1**, PSPP, employing the linear parabolic trough technology, is slightly less efficient in use of land than the Beacon Solar Energy Project, which uses the same technology. PSPP is more efficient in use of land than the Ivanpah SEGS project, which employs BrightSource power tower technology, the Calico Solar project, and the Stirling Energy Systems Solar Two project.

Alternatives to Reduce Solar Land Use Impacts

Building and operating a natural gas-fired combined cycle power plant would yield much greater land use efficiency than any solar power plant; see **Efficiency Table 1**. However, this would not achieve the basic project objective, to generate electricity from the renewable energy of the sun.

Efficiency Table 1
Solar Land Use Efficiency[1]

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]
Palen Solar (09-AFC-6)	**500**	**1,000,000**	**103,919**	**2,970**	**.17**	**337**	**332**
Beacon Solar (08-AFC-2)	250	600,000	36,000	1,240	0.20	484	480
Ivanpah SEGS (07-AFC-5)	400	960,000	432,432	3,744	0.11	256	238
SES Solar Two (08-AFC-5)	750	1,620,000	0	6,500	0.12	249	249
Calico Solar (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

Notes:
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.

Building a solar power plant employing a different technology, such as the BrightSource power tower technology of the Ivanpah SEGS project or the Stirling Engine technology of the SES Solar projects, would reduce the solar land use efficiency of PSPP by more than a third. Staff believes the proposed project represents one of the better land use-efficient solar technologies currently available.

Alternative Heat Rejection System

The applicant proposes to employ a dry cooling system (air-cooled condensers) as the means for rejecting power cycle heat from the steam turbines (Solar Millennium 2009a, AFC §§2.5.1, 2.5.5.2). An alternative heat rejection system would utilize evaporative cooling towers.

The local climate in the project area is characterized by high temperatures and low relative humidity (low wet-bulb temperature). In low temperatures and high relative humidity (low dry-bulb temperature), the air-cooled condenser performs relatively efficiently compared to the evaporative tower. However, at the project area (low wet-bulb temperature and high dry-bulb temperature) the air-cooled condenser performance is relatively poor compared to that of an evaporative cooling tower. Furthermore, the performance of the heat rejection system affects the performance of the steam turbine, impacting turbine efficiency. However, to conserve water in the project site's desert environment, the applicant proposes to employ dry cooling. Even though evaporative cooling could offer greater efficiency, staff believes the applicant's selection of dry cooling is a reasonable tradeoff as it would prevent potentially significant environmental impacts that could result from consumption of the large quantities of water required by wet cooling.

D.3.4.3 CEQA LEVEL OF SIGNIFICANCE

CEQA guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Title 14 CCR §15126.4[a][1]). Appendix F of the guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce the wasteful, inefficient, and unnecessary consumption of energy (Title 14, CCR §15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- adverse effects on local and regional energy supplies and energy resources;
- a requirement for additional energy supply capacity;
- noncompliance with existing energy standards; or
- the wasteful, inefficient, and unnecessary consumption of fuel or energy.

The discussions under **Fossil Fuel Use Efficiency** and **Solar Land Use Efficiency** in Subsection **D.3.3** also describe the CEQA level of significance as related to power plant efficiency.

D.3.5 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

This alternative is analyzed because:

1. It would retain the 500 MW generation capacity defined for the proposed project and the engineering is defined by Solar Millennium as feasible;
2. It reduces impacts to the primary and secondary desert washes that cross the proposed site; and
3. It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

D.3.5.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the Solar Millennium Palen ROW application area but the alternative would remain entirely within BLM managed lands.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. The setting for Unit 2 would be similar to that for the proposed project.

This alternative would have the same generating capacity (500 MW) and the same project footprint (2,970 acres) as the proposed project.

D.3.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Land use efficiency as well as fossil fuel use of this alternative would remain the same, as both power output and occupied land would be unchanged.

D.3.5.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA Level of Significance of the Reconfigured Alternative would be unchanged from the proposed project.

D.3.6 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

D.3.6.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

This alternative would have the same generating capacity (500 MW) and approximately the same project footprint as the proposed project.

D.3.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Land use efficiency as well as fossil fuel use of this alternative would remain the same, as both power output and occupied land would be unchanged. However, the Reconfigured Alternative #2 solar field arrangement in the eastern field (Unit 1) has been geometrically adjusted to a nonrectangular arrangement that is less than optimal from an operational perspective (Solar Millennium 2010n).

D.3.6.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA Level of Significance of Reconfigured Alternative #2 would be unchanged from the proposed project.

D.3.7 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

D.3.7.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern half of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located on primarily on public land managed by BLM; however, as with the proposed project, it include a 40 acre private parcel on which the applicant has a purchase option. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

This alternative would have the same generating capacity (500 MW) and approximately the same project footprint as the proposed project.

D.3.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Land use efficiency as well as fossil fuel use of this alternative would remain the same, as both power output and occupied land would be unchanged. However, the Reconfigured Alternative #3 solar field arrangement in the eastern field (Unit 1) has been geometrically adjusted to a nonrectangular arrangement that is less than optimal from an operational perspective (AECOM 2010i).

D.3.7.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA Level of Significance of Reconfigured Alternative #3 would be unchanged from the proposed project.

D.3.8 NO PROJECT/NO ACTION ALTERNATIVES

No Project/No Action Alternative #1:

No Action on Palen Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no ground disturbance. The decreased reliance on fossil fuel and increased reliance on renewable energy resources that would occur with the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

No Project/No Action Alternative #2:

No Action on Palen Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Construction and operation requirements for

solar technologies vary; however, they would all decrease reliance on fossil fuel, and would increase reliance on renewable energy resources as with the proposed project.

No Project/No Action Alternative #3:

No Action on Palen Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction of a solar facility. Therefore, there would be no decreased reliance on fossil fuel and no increased reliance on renewable energy resources as with the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

D.3.9 CUMULATIVE IMPACT ANALYSIS

There are no nearby power plant projects or other projects consuming large amounts of fossil fuel that hold the potential for cumulative energy consumption impacts when aggregated with the project.

Staff believes that the construction and operation of the project would not create indirect impacts (in the form of additional fuel consumption) that would not have otherwise occurred without this project. Because the proposed project would consume significantly less fossil fuel than a typical fossil fuel-fired power plant, it should compete favorably in

the California power market and replace fossil fuel burning power plants. The project would therefore cause a positive impact on the cumulative amount of fossil fuel consumed for power generation.

D.3.10 COMPLIANCE WITH LORS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

D.3.11 NOTEWORTHY PUBLIC BENEFITS

PSPP would employ an advanced solar thermal technology. Solar energy is renewable and unlimited. The project would have a less than significant adverse impact on nonrenewable energy resources. Consequently, the project would help in reducing California's dependence on fossil fuel-fired power plants.

D.3.12 RESPONSE TO PUBLIC AND AGENCY COMMENTS

No public or agency comments were received pertaining to Power Plant Efficiency.

D.3.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

No conditions of certification are proposed.

D.3.14 CONCLUSIONS

Fossil Fuel Energy Use

PSPP, if constructed and operated as proposed, would use solar energy to generate most of its capacity, consuming insignificant amounts of fossil fuel for power production. The project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to this project. Staff therefore concludes that this project would present no significant adverse impacts on energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

Land Use

PSPP, if constructed and operated as proposed, would occupy approximately 6 acres per MW of power output, a figure considerably less than that of some other solar power technologies. Employing a more land-intensive solar technology, such as the BrightSource power tower technology or Stirling Engine technology, would almost halve the land use efficiency. Staff believes PSPP represents one of the most land use-efficient solar technologies currently available.

D.3.15 REFERENCES

CEC 2008d – Report of Conversation between Steve Baker (CEC staff, Power Plant Siting Division) and Golam Kibrya (CEC staff, Energy Resource and Development Division). February 22, 2008.

Solar Millennium 2009a – Solar Millennium (tn: 52939). Application for Certification Vol 1 & 2, dated 8/24/2009.

Solar Millennium 2009b – Solar Millennium (tn: 54008). Data Adequacy Supplement, dated 10/26/2009.

Solar Millennium 2010n – Solar Millennium (tn: 57792). Applicant's Data Responses to Alternatives 2 &3.

Efficiency Appendix A
Solar Power Plant Efficiency Calculation
Gas-Fired Proxy

In calculating the efficiency of a solar power plant, it is desired to subtract the effect of natural gas burned for morning startup, cloudy weather augmentation and Therminol freeze protection. As a proxy, we will use an average efficiency based on several recent baseload combined cycle power plant projects in the Energy Commission siting process. Baseload combined cycles were chosen because their intended dispatch most nearly mirrors the intended dispatch of solar plants, that is, operate at full load in a position high on the dispatch authority's loading order.

The most recent such projects are:

Colusa Generating Station (06-AFC-9)

- Nominal 660 MW 2-on-1 Combined Cycle with GE Frame 7FA CGTs
- Air cooled condenser, evaporative inlet air cooling
- Efficiency with duct burners on: 666.3 MW @ 52.5% LHV
- Efficiency with duct burners off: 519.4 MW @ 55.3% LHV
- Efficiency (average of these two): **53.9% LHV**

San Gabriel Generating Station (07-AFC-2)

- Nominal 696 MW 2-on-1 Combined Cycle with Siemens 5000F CGTs
- Air cooled condenser, evaporative inlet air cooling
- Efficiency with duct burners on: 695.8 MW @ 52.1% LHV
- Efficiency with duct burners off: 556.9 MW @ 55.1% LHV
- Efficiency (average of these two): **53.6% LHV**

KRCD Community Power Plant (07-AFC-7)

- Nominal 565 MW 2-on-1 Combined Cycle with GE or Siemens F-class CGTs
- Evaporative cooling, evaporative or fogging inlet air cooling
- Efficiency with GE CGTs: 497 MW @ 54.6% LHV
- Efficiency with Siemens CGTs: 565 MW @ 56.1% LHV
- Efficiency (average of these two): **55.4% LHV**

Avenal Energy (08-AFC-1)

- Nominal 600 MW 2-on-1 Combined Cycle with GE Frame 7FA CGTs
- Air cooled condenser, inlet air chillers
- Efficiency with duct burners on: 600.0 MW @ 50.5% LHV
- Efficiency with duct burners off: 506.5 MW @ 53.4% LHV
- Efficiency (average of these two): **52.0% LHV**

Average of these four power plants: **53.7% LHV**

D.4 – POWER PLANT RELIABILITY

Testimony of Erin Bright

D.4.1 SUMMARY OF CONCLUSIONS

The applicant predicts an equivalent availability factor of 97%, which staff believes is achievable (The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability). Based on a review of the proposal, staff concludes that the Palen Solar Power Project would be built and would operate in a manner consistent with industry norms for reliable operation. No conditions of certification are proposed.

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

D.4.2 INTRODUCTION

In this analysis, California Energy Commission (Energy Commission) staff addresses the reliability issues of the Palen Solar Power Project (Palen Solar) to determine if the power plant is likely to be built in accordance with typical industry norms for reliable power generation. Staff uses this norm as a benchmark because it ensures that the resulting project would not be likely to degrade the overall reliability of the electric system it serves (see the “Setting” subsection, below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliable power generation. While the applicant has predicted an availability factor of 97% for Palen Solar (see below), staff commonly uses typical industry norms as the benchmark, rather than the applicant’s projection, to evaluate the project’s reliability.

D.4.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

D.4.3.1 METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to how a project is designed, sited, and operated in order to ensure its safe and reliable operation (Title 20, CCR §1752[c]).

Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if a project is at least as reliable as other power plants on that system.

The availability factor of a power plant is the percentage of time it is available to generate power; both planned (such as maintenance) and unplanned outages (such as an outage due to extreme inclement weather) subtract from this availability. For a solar power plant, the availability factor is a percentage of just daytime hours because the technology does not produce electricity at night. Measures of power plant reliability are based upon both the plant's actual ability to generate power when it is considered to be available and upon starting failures and unplanned (or forced) outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Throughout its intended 30-year life, Palen Solar is expected to operate reliably (Solar Millennium 2009a, AFC § 3.2). Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability requires adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If the factors compare favorably for this project, staff may then conclude that Palen Solar would be as reliable as other power plants on the electric system and would not degrade system reliability.

D.4.4 PROPOSED PROJECT

D.4.4.1 SETTING AND EXISTING CONDITIONS

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the state's control area operators, such as the California Independent System Operator (California ISO), that purchase, dispatch, and sell electric power throughout the state. Determining how the California ISO and other control area operators would ensure system reliability has been an ongoing effort. Protocols that allow sufficient reliability to be maintained under the competitive market system have been developed and put in place. "Must-run" power purchase agreements and "participating generator" agreements are two mechanisms that have been employed to ensure an adequate supply of reliable power.

The California ISO's mechanisms to ensure adequate power plant reliability apparently were devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there has been valid cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants were to exhibit individual reliability sufficiently lower than this historical level, the assumptions used by California ISO to ensure system reliability would prove invalid, with potentially disappointing results. Accordingly, staff has recommended that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

As part of its plan to provide needed reliability, the applicant proposes to operate the 500-megawatt (MW) (net power output) Palen Solar, a solar thermal power plant facility employing advanced solar power technology. This project, using renewable solar energy, would provide dependable power to the grid, generally during the hours of peak power consumption by the interconnecting utility(s). This project would help serve the need for renewable energy in California, as all its generated electricity would be produced by a reliable source of energy that is available during the hot summer afternoons, when power is needed most.

The project applicant has indicated it expects the proposed project to achieve an availability factor of 97%. The project is anticipated to operate at an annual capacity factor of approximately 26% (Solar Millennium2009b, DA-PPR-1).

D.4.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Equipment Availability

Equipment availability would be ensured by adoption of appropriate quality assurance/ quality control (QA/QC) programs during the design, procurement, construction, and operation of the plant and by providing for adequate maintenance and repair of the equipment and systems discussed below.

Quality Control Program

The applicant describes a QA/QC program (AECOM 2010a, DR-PPR-180) that is typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs, and quality history would be evaluated. The project owner would perform receipt inspections, test components, and administer independent testing contracts. Staff expects that implementation of this program would result in typical reliability of design and construction. To ensure this implementation, staff has proposed appropriate conditions of certification in the section of this document entitled **Facility Design**.

D.4.4.3 PLANT MAINTAINABILITY

Equipment Redundancy

The project, as proposed in the AFC, would be able to operate only when the sun is shining. Maintenance or repairs could be done when the plant is shut down at night. This would help to enhance the project's reliability. The fact that the project would consist of two separate units operating in parallel provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at reduced output). The nature of solar thermal generating technology also provides inherent redundancy; the series-parallel arrangement of solar collector assemblies would allow for reduced output generation if one (or possible several) rows of solar collectors were to require service or repair (Solar Millennium2009a, AFC §§ 2.5.1, 2.5.3). This redundancy would allow service or repair to be done during sunny days when the plant is in operation, if required.

Major plant systems are designed with adequate redundancy to ensure their continued operation if equipment fails.

Maintenance Program

Equipment manufacturers provide maintenance recommendations for their products, and the applicant would most likely base the project's maintenance program on those recommendations. Such a program would encompass both preventive and predictive maintenance techniques. Maintenance outages would probably be planned for periods of low electricity demand. Staff expects that the project would be adequately maintained to ensure an acceptable level of reliability.

D.4.4.4 FUEL AND WATER AVAILABILITY

The long-term availability of fuel and of water for cooling or process use is necessary to ensure the reliability of any power plant. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant could be curtailed, threatening both the power supply and the economic viability of the plant.

Fuel Availability

Palen Solar would consume insignificant amounts of propane for power generation. The sole consumption of propane would be to reduce startup time and to keep the temperature of the heat transfer fluid above its freezing point.

Propane would be delivered to the Palen Solar site via truck and stored onsite in above-ground tanks (Solar Millennium2009a, AFC § 2.5.5.1). Staff believes that there will be adequate fuel supply to meet the project's needs.

Water Supply Reliability

Palen Solar has proposed to use well water for domestic and industrial water needs, including steam cycle makeup, mirror washing, service water and fire protection water. The project would be dry cooled, so no water would be required for power plant cooling. The quantities of water to be consumed by the project are relatively small compared to the capacity of the resource available, and it seems feasible to physically draw out the water for delivery to the project site. Thus, this source of water supply seems adequate. Therefore, at this time, staff concludes that this source of water supply is a reliable source of water for the project (see the **Soil and Water Resources** section of this document for further discussion of water supply).

D.4.4.5 POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. Tsunamis (tidal waves) and seiches (waves in inland bodies of water) are not likely to present hazards for this project, but seismic shaking (earthquakes), flooding and high winds could present credible threats to the project's reliable operation (Solar Millennium2009a, AFC §§ 2.5.6, 5.5.2, 5.17.2.9).

Seismic Shaking

The site lies within Seismic Zone 4; no active faults are present within the project boundaries or within a 2.5 mile radius of the site (Solar Millennium2009a, AFC §§ 5.5, 5.5.2.2); see the "Faulting and Seismicity" portion of the **Geology and Paleontology** section of this document. The project will be designed and constructed to the latest applicable LORS (Solar Millennium2009a, AFC Appendix C). Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been continually upgraded. Because it would be built to the latest seismic design LORS, this project would likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see the section of this document entitled **Facility Design**. In light of the general historical performance of California power plants and the electrical system in seismic events, staff has no special concerns with the power plant's functional reliability during earthquakes.

Flooding

Portions of the site lie within a 100-year or 500-year flood plain (Solar Millennium2009a, AFC § 5.17.1.3). Project features would be designed and built to provide adequate levels of flood resistance. Staff believes there are no special concerns with power plant functional reliability due to flooding. For further discussion, see **Soil and Water Resources** and **Geology and Paleontology**.

High Winds

High winds are common in the region of the site, which could potentially cause damage to the solar mirrors. Project features would be built to withstand wind loading, and wind fencing would be installed around the project perimeter to reduce the effects of wind; however, mirror arrays would have to be stowed during high winds to protect the mirrors. Design would be in accordance with applicable LORS, including the 2007 California Building Code (Solar Millennium2009a, AFC §§ 2.5.6.2, 2.5.6.5). Staff believes there are no special concerns with power plant functional reliability due to wind.

D.4.4.6 COMPARISON WITH EXISTING FACILITIES

The North American Electric Reliability Corporation (NERC) maintains industry statistics for availability factors (as well as other related reliability data). The NERC regularly polls North American utility companies on their project reliability through its Generating Availability Data System and periodically summarizes and publishes those statistics on the Internet at <http://www.nerc.com>. Energy Commission staff typically compares the applicant's claims for reliability to the statistical reliability of similar power plants. Because solar technology is relatively new and the technologies employed so varied, no NERC statistics are available for solar power plants. Staff's typical comparison with other existing facilities thus cannot be accomplished. However, based on experience with many power plants and due to the proven solar thermal technology proposed for this project, staff believes that the stated range of availability factor for the project is reasonable and likely achievable.

D.4.4.7 CEQA LEVEL OF SIGNIFICANCE

This does not apply to power plant reliability.

D.4.5 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is defined by Solar Millennium as feasible;
- It reduces impacts to the primary and secondary desert washes that cross the proposed site; and
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site.

D.4.5.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the Solar Millennium Palen ROW application area but the alternative would remain entirely within BLM managed lands.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. The setting for Unit 2 would be similar to that for the proposed project.

D.4.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The availability factor of the Reconfigured Alternative would be unchanged from the proposed project because the same generating technology would be employed. The adverse impact of this alternative on the power system reliability in an event of a plant failure would be the same as the proposed project because the alternative project would have the same generating capacity, 500 MW.

D.4.5.3 CEQA LEVEL OF SIGNIFICANCE

This does not apply to power plant reliability.

D.4.6 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

D.4.6.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

D.4.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The availability factor of Reconfigured Alternative #2 would be unchanged from the proposed project because the same generating technology would be employed. The adverse impact of this alternative on the power system reliability in an event of a plant failure would be the same as the proposed project because the alternative project would have the same generating capacity, 500 MW.

D.4.6.3 CEQA LEVEL OF SIGNIFICANCE

This does not apply to power plant reliability.

D.4.7 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;

- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

D.4.7.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern half of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located on primarily on public land managed by BLM; however, as with the proposed project, it include a 40 acre private parcel on which the applicant has a purchase option. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

D.4.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The availability factor of Reconfigured Alternative #3 would be unchanged from the proposed project because the same generating technology would be employed. The adverse impact of this alternative on the power system reliability in an event of a plant failure would be the same as the proposed project because the alternative project would have the same generating capacity, 500 MW.

D.4.7.3 CEQA LEVEL OF SIGNIFICANCE

This does not apply to power plant reliability.

D.4.8 NO PROJECT/NO ACTION ALTERNATIVES

No Project/No Action Alternative #1:

No Action on Palen Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM. and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no ground disturbance. As a result, the power generation benefits of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with

BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

No Project/No Action Alternative #2:

No Action on Palen Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. It is expected that the solar technology would be built in accordance with typical industry norms for reliable power generation. Because it is expected that all solar technologies would be built in accordance with typical industry norms, the reliability benefits of the alternative would likely be similar to under proposed project.

No Project/No Action Alternative #3:

No Action on Palen Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction of a solar facility. Therefore, no benefits resulting from additional power generation would occur with this alternative. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

D.4.9 PROJECT-RELATED FUTURE ACTIONS

The Southern California Edison (SCE) 230/500 kV Red Bluff Substation is considered to be reasonably foreseeable actions that would be contingent on construction of the proposed PSPP. The Red Bluff Substation would not impact the reliability of any power plant, including the proposed PSPP, and therefore, no analysis is required.

D.4.10 NOTEWORTHY PUBLIC BENEFITS

This project, if successful, would help serve the need for renewable energy in California, as all of the electricity generated would be produced by a reliable source of energy that is available during the hot summer afternoons, when power is needed most.

D.4.11 RESPONSE TO PUBLIC AND AGENCY COMMENTS

No public or agency comments were received regarding Power Plant Reliability.

D.4.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

No Conditions of Certification are proposed.

D.4.13 CONCLUSIONS

The applicant predicts an equivalent availability factor of 97%, which staff believes is achievable (The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability). Based on a review of the proposal, staff concludes that the Palen Solar Power Project would be built and would operate in a manner consistent with industry norms for reliable operation. No conditions of certification are proposed.

D.4.14 REFERENCES

AECOM 2010a – AECOM Environment (tn: 55037). Data Responses, Set 1 (#1-260), dated 1/22/2010.

Solar Millennium 2009a – Solar Millennium (tn: 52937). Application for Certification Vol 1 & 2, dated 8/24/2009.

Solar Millennium 2009b – Solar Millennium (tn: 54007). Data Adequacy Supplement, dated 10/26/2009.

D.5 – TRANSMISSION SYSTEM ENGINEERING

Testimony of Sudath Edirisuriya and Mark Hesters

D.5.1 SUMMARY OF CONCLUSIONS

The proposed interconnection facilities including the Palen Solar Power Project (PSPP) 230 kV Central switchyard, the generator 230 kV overhead tie line and its termination at the new Southern California Edison (SCE) Red Bluff 230 kV substation, are acceptable and would comply with applicable laws, ordinances, regulations and standards (LORS). The project interconnection to the grid would require additional downstream transmission facilities (other than those proposed by the applicant) that require California Environmental Quality Act (CEQA) review. The CEQA review of the downstream transmission facilities has been included as an attachment to this document.

The California Independent System Operator's (California ISO) Transition Cluster Phase II Study Report – Group Report in SCE's Eastern Bulk System (Phase II Group Study) indicates the reliable interconnection and delivery of projects in the Eastern bulk system, which includes the PSPP, would require the following upgrades to the existing or planned SCE transmission system:

- Replacement or upgrade of many circuit breakers at substations in the SCE system. Circuit breaker replacement generally occurs within the fenceline of existing substation facilities.
- Construction of the Red Bluff substation and looping the 2nd Colorado River–Devers 500 kV transmission line into the proposed Red Bluff substation. The environmental analysis of this approximately 2 miles of new transmission facilities and the Red Bluff substation has been included as Appendix A of this document.
- The use of new or expanded Special Protection Systems (SPS). These are essentially operating procedures that reduce the output of generators under specific conditions in order to avoid overloading transmission equipment.
- Expansion of the proposed Colorado substation. The environmental analysis of the substation expansion was completed for the Blythe Solar Power Project and has been provided as Appendix B of this document.
- The reconductoring and relocation of four 220 kV transmission lines west of the Devers substation. These upgrades, called the West of Devers upgrades, have been identified in SCE transmission plans for several years starting in 2007 as needed to reliably serve future loads in the SCE service area and would therefore be needed to maintain system reliability even if the Eastern Bulk System generators were not constructed.
- Reconductor of the drops of the Mira Loma–Vista 220 kV transmission line at the Vista substation. The "drops" are the portion of the line that comes into the substation.

Staff's proposed Condition of Certification TSE -5 requires the submittal of the executed Large Generator Interconnection Agreement (LGIA) and that the design, construction, and operation of the proposed transmission facilities conform to all applicable LORS prior to the start of construction of transmission facilities.

If the Commission certifies alternatives 2 or 3, adoption of staff's proposed conditions of certification will ensure that these alternatives will not result in any unmitigated significant adverse impacts and that they will comply with all applicable laws, ordinances, regulations, and standards.

D.5.2 INTRODUCTION

D.5.2.1 STAFF ANALYSIS

The Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conforms to all applicable LORS required for safe and reliable electric power transmission. Staff's analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant. Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). Therefore, the Energy Commission must identify the system impacts and necessary new or modified downstream transmission facilities (beyond the first point of the proposed interconnection) that are required for interconnection and represent the "whole of the action." The downstream network upgrade mitigation measures that will be required to maintain system reliability after the addition of the power plant, are used to identify the requirement for any additional CEQA analysis for potential indirect impacts.

According to the previous guidelines, staff relied on the System Impact Study (SIS) and Facility Study (FS) as well as the review of these studies by the agencies responsible for ensuring the adjacent interconnecting grid meets reliability standards. The proposed PSPP would interconnect to the SCE transmission network and requires analysis by SCE and approval by the California ISO. However, the California ISO's generator interconnection study process under the new Large Generator Interconnection Procedures (LGIP) Tariff is in transition from a queue or serial process to a cluster window process and now uses Phase I Interconnection Study (Phase I Study) and Phase II Interconnection Study (Phase II Study). The Phase I Study is similar to the former SIS except it is now performed for a group of projects in the same geographical area of a utility that apply for interconnection in the same request window. The Phase II Study (former Facilities Study) is performed after generators in each cluster meet specific milestones required to stay in the generator interconnection queue. The Phase II Study is then performed based on those generators left in the queue. The interconnection studies analyze the effect of the proposed project on the ability of the transmission network to meet reliability standards (California ISO 2009a).

D.5.2.2 SOUTHERN CALIFORNIA EDISON'S ROLE

SCE is responsible for ensuring electric system reliability in the SCE system for interconnection of the proposed generating plant. SCE will provide the analysis and reports in their Phase I and Phase II Studies, and their approval for the facilities and changes required in the SCE system for addition of the proposed transmission modifications.

D.5.2.3 CALIFORNIA ISO'S ROLE

The California ISO is responsible for ensuring electric system reliability for all participating transmission owners and is also responsible for developing the standards necessary to achieve system reliability. The California ISO is responsible for completing the studies of the SCE system to ensure adequacy of the proposed transmission interconnection. The California ISO will determine the reliability impacts of the proposed transmission modifications on the SCE transmission system in accordance with all applicable reliability criteria. According to the California ISO Tariff, the California ISO will determine the "Need" for transmission additions or upgrades downstream from the interconnection point to ensure reliability of the transmission grid. The California ISO will, therefore, review the Phase I Study performed by SCE, and provide its analysis, conclusions and recommendations. Upon completion of the Phase II Study, the California ISO will provide its final conclusions and recommendations, and execute a Large Generator Interconnection Agreement (LGIA) with the project owner. If necessary, the California ISO may provide written and verbal testimony on their findings at the Energy Commission hearings.

D.5.3 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), "Rules for Overhead Electric Line Construction," formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance and operation or use of overhead electric lines and to the public in general.
- California Public Utilities Commission (CPUC) General Order 128 (GO-128), "Rules for Construction of Underground Electric Supply and Communications Systems," formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code, 1999 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Council (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage and stability limits. These standards include the 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 the 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 the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines along a common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, their uncontrolled loss is not permitted (WECC 2006).

- North American Reliability Council (NERC) Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability Standards provide for system performance levels under normal and contingency conditions. With regard to power flow and stability simulations, while these Reliability Standards are similar to NERC/WECC Standards, certain aspects of the NERC/WECC Standards are either more stringent or more specific than the NERC Standards for Transmission System Contingency Performance. The NERC Reliability Standards apply not only to interconnected system operation but also to individual service areas (NERC 2006).
- 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).

D.5.4 PROJECT DESCRIPTION

D.5.4.1 SETTING AND EXISTING CONDITIONS

Palen Solar I, LLC[1] proposes to construct, own and operate the PSPP. The proposed project would be a concentrated solar thermal electric generating facility with two adjacent and identical solar plants. Each solar generating plant would use a 300 MVA steam turbine generating unit for a combined net output of 530 MW; although, the applicant has only applied for a 500 MW interconnection at the California ISO and in the AFC. The project's planned operational date is summer 2013. Each generator's auxiliary load would be approximately 36 MW, resulting in a maximum net output of 265 MW at a 90% power factor. Each generating unit would be connected to the low side of its dedicated 18/230 kV generator step-up (GSU) transformer through 24 kV, 12,000 ampere disconnect switch and a 24 kV, 10,000 ampere circuit breaker. The step-up transformer for each steam turbine generating unit would be rated at 18/230 kV and 210/285/350 megavolt ampere (MVA) at 65-degrees centigrade. For each generating unit the 230 kV side of its step-up transformer would be connected through a 230 kV, 3,000 ampere disconnect switch and a single circuit 230 kV transmission line to the proposed Palen Central 230 kV switching station. Generating Unit 1 requires a 9,200 foot transmission line to the switching station and Generating Unit 2 requires a 4,000 foot transmission line. Each line would be connected to a common bus segment at the Palen Central switchyard. The proposed Palen switchyard would consist of a 230 kV, 2,000 amps circuit breaker, two 230 kV, 300 amps disconnect switches and protection circuits. (PSPP 2009b, section 1.0, 2.6 and Figures 2.9, 2-14, 2-15, 2-16)

D.5.4.2 SWITCHYARDS AND INTERCONNECTION FACILITIES

The PSPP power would be transmitted from the Palen Central switchyard to the proposed SCE 500/230 kV Red Bluff substation via an 8 mile long double circuit 230 kV transmission line. Each phase of the double circuit line would be built with twin bundled, 795 kcmil conductors which are capable of carrying 1,814 amps at 75 degrees centigrade. The proposed overhead generator transmission line is rated to carry the full capacity of the 500 MW PSPP. The 230 kV transmission line would be supported by mono-pole structures at approximately 800 foot intervals, and the final pole height would be determined during the detailed design phase of the transmission facilities. The applicant has proposed to extend the bus work within the breaker-and–a-half Red Bluff substation to interconnect the solar plant. The modification of the Red Bluff substation would consist of two new 230 kV, 2,000 amps circuit breakers, and five 230 kV 3,000 amps disconnect switches. (PSPP 2009b, section 1.0, 2.6 and Figures 2.9, 2-14, 2-15, 2-16)

In the Phase I Study, the California ISO and SCE assessed the proposal to connect the PSPP to the Chuckwalla Valley substation and found that it was not feasible. On May 14, 2009 the California ISO, SCE and the applicant agreed to connect the PSPP interconnection to the proposed Red Bluff 500/230 kV substation.

[1] Chevron Energy Solutions and Solar Millennium have a joint development agreement. Chevron Energy Solutions applied for the Right of Way for Palen Solar Power Project. To facilitate the permitting of the Palen Solar Power Project (PSPP), the Applicant is requesting that the CEC issue one license to a project-specific company. The company for PSPP is Palen Solar I, LLC a wholly owned subsidiary of Solar Millenium and the single applicant for the PSPP.

D.5.4.3 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility and the control area operator are responsible for ensuring grid reliability. For the PSPP, SCE and the California ISO are responsible for ensuring grid reliability.

The California ISO's generator interconnection study process is in transition from a serial process to an interconnection window cluster study process. The PSPP was studied under the window cluster process and the transmission reliability impacts of the proposed project were studied in the Phase I and Phase II Studies. The Phase I Study is similar to the former System Impact Study except it is now performed for a group of projects in the same geographical area of a utility that apply for interconnection in the same request window. The Phase II Study (former Facilities Study) is performed after generators in each cluster meet specific milestones required to stay in the generator interconnection queue. The Phase II Study is then performed based on the number of generators left in each cluster.

The Phase I and Phase II Studies for projects in the transition cluster were conducted to determine the preferred and alternative generator interconnection methods, and to identify any mitigation measures required to ensure system conformance with utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. Staff relies on the studies and any review conducted by the responsible agencies to determine the effect of the projects on the transmission grid and to identify any necessary downstream facilities or indirect project impacts required to bring the transmission network into compliance with applicable reliability standards (NERC 2006, WECC 2006, California ISO 2002a, 2007a & 2009a).

The Phase II Study analyzed the grid with and without the generator or generators in the cluster under conditions specified in the planning standards and reliability criteria. The standards and criteria defined the assumptions used in the study and established the thresholds by which grid reliability was determined. The studies must analyze the impact of the projects for their proposed first year(s) of operation and thus were based on a forecast of loads, generation and transmission. Load forecasts were developed by the interconnected utility, which was SCE in this case. Generation and transmission forecasts were based on the interconnection queue. The studies focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads or cascading outages), short circuit duties and substation evaluation.

Under the new California ISO LGIP, generators are able to choose between either "full capacity" or "energy only", depending on whether or not the generator wants to have the right to generate energy 24 hours per day. A generator that chooses the full capacity option will be required to pay for transmission network upgrades that are needed to allow the generator to operate under virtually any system conditions and as such could sign contracts that allowed them to provide capacity to utilities. Energy only generators would not pay for network transmission upgrades, and essentially would have access to as available transmission capacity, and would likely not be able to sign capacity contracts.

If the studies show that the interconnection of the project or cluster of projects causes the grid to be out of compliance with reliability standards, the study will then identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. If the interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions which require CEQA review as part of the "whole of the action," the Energy Commission must analyze those modifications or additions according to CEQA requirements. Where the Phase II Study identifies transmission modifications required for the reliable interconnection of a cluster of generators, staff will analyze the proposed generating project's impact on individual reliability criteria violations to determine whether or not the identified mitigation measures are a reasonably foreseeable consequence of the proposed project.

D.5.4.4 SCOPE OF THE TRANSITION CLUSTER PHASE I AND PHASE II INTERCONNECTION STUDIES

The July 28, 2009, Transition Cluster Phase I Interconnection Study was prepared by the California ISO in coordination with SCE. Fifteen queue generation projects, including the proposed 500 MW PSPP in the Eastern Riverside County area with a total of 9,690 MW net generation output, were included in this cluster study. As of December 4, 2009 only five projects (2,200 MW) of the original 15 projects remained in the interconnection queue. Reducing the size of the cluster by 10 projects and over 7,000 MW meant the Phase 1 Study results for the cluster were not a reasonable forecast of the reliability impacts of the proposed project.

Generally staff relies on the California ISO Phase I/SIS to determine whether or not the proposed generation project will likely comply with reliability and to identify the transmission facilities required for reliable interconnection. For the Transition Cluster projects, the Phase I Study did not provide an accurate forecast of impacts of the PSPP on the SCE transmission grid. Therefore, staff has relied on the Phase II Group Study that was completed on July 8, 2010 and received on July 23, 2010, to determine the PSPP impact on grid reliability and identify transmission upgrades for reliable interconnection.

The changes between the Transition Cluster Phase I and Phase II Studies for the Eastern Bulk System, included the withdrawal of ten generation projects totaling 7,490 MW, changing the point of interconnection of one generation project, and a reduction of 350 MW of generation from two projects. For study purposes, five generation projects totaling a maximum output of 2,200 MW were included in the SCE Transition Cluster base cases. Three of these projects, PSPP, the Blythe Solar Power Project and the Genesis Solar Energy Project are currently seeking licenses from the California Energy Commission.

The Phase II Group Study modeled the PSPP with a net output of 500 MW. The base case was developed from WECC's 2013 Peak load and 2013 Off-Peak load base case series and included all major SCE transmission projects, and all proposed higher queued generation projects that will be operational by 2013. The Phase II Group Study pre-project base cases were modeled to include the Devers–Colorado River project (DCR), which is the California portion of Devers–Palo Verde 2 (DPV2), and the proposed 500 kV switchyard at Colorado River substation. The power flow studies were conducted with and without the proposed Transition Cluster Phase II projects

connected to the SCE grid at each project's interconnection switchyard. The detailed study assumptions were described in the study. The power flow study assessed the Transition Cluster Phase II projects impact on thermal loading of the transmission lines and equipments. Transient and post-transient studies were conducted using the Peak load full loop base case to determine whether the Transition Cluster Phase II projects would create instability in the system following certain selected outages. Short circuit studies were conducted to determine if the Transition Cluster Phase II projects would overstress existing substation facilities. (Cal ISO 2010a)

PHASE II STUDY RESULTS FOR TRANSITION CLUSTER PROJECTS

Power Flow Study Results and Mitigation Measures

The Phase II Group Study identified pre-project overload criteria violations under 2013 Summer Peak and Off-Peak study condition. Pre-project overloads are caused by either existing system conditions or by projects with higher positions in the SCE's generator interconnection queue. The study concluded that the addition of the Phase II Transition Cluster projects would cause a number of pre-existing normal and /or emergency overloads to increase and would cause some new normal and emergency overloads (Cal ISO 2010a).

Results of the Phase II Group Study are detailed below. Where potential overloads were identified, mitigation was proposed to eliminate the potential reliability impact.

Normal Overloads (N-0): The power flow study indicated that the Phase II Transition Cluster projects would cause three normal overloads under 2013 Peak load conditions and Off-Peak load conditions. The predicted overload facilities were the same for both Peak and Off-Peak load conditions.

Overloaded Transmission Facilities:

- Devers–San Bernardino 220 kV No. 1 line
- Devers–San Bernardino 220 kV No. 2 line
- Devers-Vista 220 kV No. 1 line

Recommended Mitigation:

A combination of congestion management for base case and contingency overloads, the West-of-Devers upgrade project, and the looping the 2nd Colorado River–Devers 500 kV transmission line into the Red Bluff substation are required to mitigate the power flow impacts caused by the project. The detailed electrical facilities needed to mitigate the overload criteria violations have been addressed and selected in the group report in SCE's Eastern Bulk System.

Category B (N-1): The power flow study indicated that the Phase II Transition Cluster projects would cause four N-1 overloads under 2013 Peak load conditions and Off-Peak load conditions. The predicted overload facilities were the same for both Peak and Off-Peak load conditions.

Overloaded Transmission Facilities:

- Devers–San Bernardino 230 kV No. 1 line
- Devers–San Bernardino 230 kV No. 2 line
- Devers-Vista 230 kV No. 1 line
- Devers-Vista 230 kV No. 2 line

Recommended Mitigation:

A combination of congestion management for base case and contingency overloads, the West-of-Devers upgrade project, and the looping the 2nd Colorado River–Devers 500 kV transmission line into the Red Bluff substation are required to mitigate the power flow impacts caused by the project. The detailed electrical facilities needed to mitigate the overload criteria violations have been addressed and selected in the group report in SCE's Eastern Bulk System.

Category C (N-2): The power flow study indicated that the Phase II Transition Cluster projects would cause five new N-2 overloads under 2013 Peak load conditions and Off-Peak load conditions. The three predicted overload facilities were the same for both Peak and Off-Peak load conditions. Additionally one new overload was revealed.

Overloaded Transmission Facilities:

- Devers–San Bernardino 220 kV No. 1 line
- Devers–San Bernardino 220 kV No. 2 line
- Devers-Vista 220 kV line No. 1 line
- Devers-Vista 220 kV No. 2 line
- Mira Loma–Vista 220 kV No. 2 line

Recommended Mitigation:

A combination of congestion management, the West-of-Devers upgrade project, and the looping the 2nd Colorado River–Devers 500 kV transmission line into the Red Bluff substation are required to mitigate the power flow impacts caused by the project. The detailed electrical facilities needed to mitigate the overload criteria violations have been addressed and selected in the group report in SCE's Eastern Bulk System.

Transient Stability Study Results and Mitigation Measures

Transient stability studies were conducted using the full loop base cases to ensure that the transmission system remained in operating equilibrium, as well as operating in a coordinated fashion, through abnormal operating conditions after the Phase II Transition Cluster projects became operational. Disturbance simulations were performed for a study period of 10 seconds to determine whether the Phase II Transition Cluster projects would create any system instability during line and generator outages. All outage cases were evaluated with the assumption that existing Special Protection Systems (SPS) or Remedial Action Schemes (RAS) would operate as designed. The

most critical single contingency and double contingency outage conditions in the east and west of Devers area within the overall SCE Eastern Bulk System were evaluated. The transient study identified system instability during the N-2 outages. Therefore, an SPS has been proposed as a mitigation measure that will curtail the 1,400 MW of generation of the Phase II Transition Cluster projects. The proposed PSPP project has been included in rearming the SPS. (Transition Cluster Phase II Interconnection Study Report, SCE's Eastern Bulk System, Appendix F Dynamic Stability Plots)

Reactive Power Deficiency Analysis Results

Reactive power deficiency analysis was performed in the group study. The reactive power deficiency analysis included power flow sensitivity analysis in the Eastern Bulk System. The study found no reactive deficiency from this PSPP project to the SCE bulk system.

Short Circuit Study Results and Mitigation Measures

Short circuit studies were performed to determine the degree to which the addition of the Phase II Transition Cluster projects would increase fault duties at SCE's substations, adjacent utility substations, and the other 115 kV, 230 kV and 500 kV busses within the study area. The fault duties were calculated with and without the Phase II Transition Cluster projects to identify any equipment overstress conditions. All bus locations where the Phase II Transition Cluster projects increased the short circuit duty by 0.1 kA or more and where the short circuit duty was in excess of 60% of the minimum breaker nameplate rating are listed in Appendix H of the Transition Cluster Phase II Interconnection Study Report, SCE's Eastern Bulk System. With the addition of the Transition Cluster Phase II projects, the following overstressed circuit breakers were identified at the following substations: Vincent 500 kV substation – 11 breakers, Kramer 220 kV substation – 5 breakers, Windhub 220 kV substation – 9 breakers, and Antelope 66 kV substation – 2 breakers. Mitigation measures included the following:

- Vincent 500 kV substation: replace seven circuit breakers and upgrade four circuit breakers
- Kramer 220 kV substation: replace five circuit breakers
- Windhub 220 kV substation: sectionalize 220 kV bus
- Antelope 66 kV substation: operating procedure to reduce short circuit duty

D.5.4.5 CEQA LEVEL OF SIGNIFICANCE

Generally staff relies on the California ISO Phase I/SIS to determine whether or not the proposed generation project will likely comply with reliability and to identify the transmission facilities required for reliable interconnection. For the Transition Cluster projects, the Phase I Interconnection Study did not provide an accurate forecast of impacts of the PSPP on the SCE transmission grid. Therefore, staff relied on the Phase II Group Study that was completed on July 8, 2010 and received on July 23, 2010, to determine the PSPP impact on grid reliability, identify transmission upgrades for reliable interconnection, and mitigation measures to this RSA. In order to ensure compliance with reliability LORS, Condition of Certification TSE-5 requires the executed Large Generator Interconnection Agreement prior to the start of construction of transmission facilities.

D.5.4.5.1 Downstream Facilities

The Phase II Group Study determined that several downstream reliability upgrades outside the existing substation fence lines will be needed to accommodate Eastern Bulk System cluster of projects which includes the proposed PSPP. Many of the downstream upgrades would be constructed within the fence line of an existing substation and would require little or no environmental licensing while other upgrades would require environmental permitting and analysis by the California Public Utilities Commission (CPUC) and relevant federal agencies.

In summary, to reliably interconnect and deliver the power generation of the Eastern Bulk System generators, including the PSPP, the following network upgrades are required:

- Replacement and upgrade of circuit breakers at the Vincent, Kramer, Windhub and Antelope substations. Circuit breaker replacement or upgrades generally occur within the fencelines of existing facilities and do not require CEQA analysis.
- Construction and/or expansion of the Red Bluff Substation and the looping in of the Colorado River–Devers 500 kV No. 2 transmission line into the Red Bluff Substation. The environmental analysis of the Red Bluff substation and the loop in of the Colorado River–Devers 500 kV transmission line has been provided in Transmission System Engineering Appendix A. These facilities will require a full CEQA analysis and license from the CPUC and an Environmental Impact Statement from Bureau of Land Management.
- The expansion of the Colorado River Substation. Staff has analyzed the expansion of the Colorado substation as part of its Supplemental Staff Assessment for the Blythe Solar Power Plant. The expansion of the proposed Colorado River Substation is required for all of the Eastern Bulk System projects and the environmental analysis is the same; hence, the environmental analysis included as Transmission System Engineering Appendix B references the Blythe Solar Power Project, but is equally applicable here.
- Replacement of the drops on Mira Loma–Vista 230 kV No. 2 transmission at Vista Substation. The drops are the segment of the line that enters the substation and do not require environmental analysis.
- Development of SPS which would drop generation under certain contingency conditions.
- The West of Devers 230 kV Line Upgrades project. The West of Devers project consists of the reconductoring and relocation of two 35-mile 220 kV circuits between the Devers and San Bernardino substations and two 37-mile 220 kV circuits between the Devers and Vista substations. The West of Devers project has been included in the SCE/California ISO Transmission Plan for several years because it is needed to reliably serve loads in southern California. Because the West of Devers project is a previously planned project that would be required for the SCE system to meet reliability standards even if the Eastern Bulk System generators were not operating staff does not believe transmission upgrade should be considered a reasonably foreseeable consequence of the PSPP.

D.5.5 RECONFIGURED ALTERNATIVE

The Reconfigured Alternative would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in **Alternatives Figure 1**.

Proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the Solar Millennium Palen ROW application area but the alternative would remain entirely within BLM managed lands.

Proposed Unit 2 (the western solar field) would remain in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site.

D.5.5.1 SETTING AND EXISTING CONDITIONS

The Reconfigured Alternative would change the shapes of both Units 1 and 2. Unit 1 would be a 250 MW solar generating facility on about 1,490 acres and Unit 2 would be a 250 MW solar generating facility, on approximately 1,450 acres of land. The reconfigured units would use approximately 180 acres more land than the proposed Units 1 and 2 which were located on 1,380 acres each. In addition to reconfiguring the Unit 1 and 2 solar fields, it would also modify the power block, water treatment system, water storage tanks, and the administration, control, warehouse, maintenance, and lab buildings. See **Alternatives Figure 1**.

D.5.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Similar to the proposed project, the Reconfigured Alternative would transmit power to the grid through the Colorado River Substation. It would require the same infrastructure as the proposed project, including on-site wells, transmission line, road access, gas pipeline, main office and warehouse buildings, and central internal switchyard. The transmission line, road access, and gas pipeline would remain approximately the same length as for the proposed project. The required linear facility routes would require minor adjustments to accommodate the changed solar field configurations. The reconfigured 250 MW with the same interconnection to the Red Bluff Substation would have the same impacts on transmission system reliability as the proposed project.

D.5.5.3 CEQA LEVEL OF SIGNIFICANCE

As stated above, the Reconfigured Alternative is evaluated in this RSA because it would reduce some impacts of the project. Additionally, the Reconfigured Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A reduced acreage alternative was suggested in scoping comments.

D.5.6 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be about 25% smaller, occupying about 2,080 acres of land (as compared with 2,740 acres required for Units 1 and 2 of the proposed project). The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 2**.

The Reduced Acreage Alternative would have a net generating capacity of approximately 375 MW (as compared with the 500 MW of the proposed project). This alternative would retain 75% of the proposed project's generating capacity, and would affect 75% of the land affected by the proposed project.

D.5.6.1 SETTING AND EXISTING CONDITIONS

The Reduced Acreage Alternative would retain the basic solar collector assemblies, retain the north-south alignment of collector rows, and retain all loops at the same size (as required for feasibility of the project design). The reconfigured Unit 1 would reduce impacts to dune habitat and the Chuckwalla Valley sand dune corridor and result in an approximately 125 MW power facility. By reconfiguring Unit 2, the project would avoid impacts to desert tortoise critical habitat and dune habitat while retaining the acreage and configuration to power a nominal 250 MW power facility.

D.5.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Similar to the proposed project, the Reduced Acreage Alternative would transmit power to the grid through the Colorado River Substation. It would require infrastructure including on-site wells, transmission line, road access, administration building, gas pipeline, main office and warehouse buildings, and central internal switchyard. The transmission line and road access would remain approximately the same length as for the proposed project. The gas pipeline would also remain approximately the same length as for the proposed project. The linears would require minor adjustments to accommodate the modified layout.

D.5.6.3 CEQA LEVEL OF SIGNIFICANCE

As stated above, the Reduced Acreage Alternative is evaluated in this RSA because it would reduce some impacts of the project. Reducing the output of the facility from 500 MW to 375 MW would likely reduce the impacts of the project on the reliability of the transmission system. Additionally, the Reduced Acreage Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment.

D.5.7 RECONFIGURED ALTERNATIVE #2

The Reconfigured Alternative #2 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1B**. The solar Unit 2 would remain as proposed for the

proposed project. The overall disturbance area for Reconfigured Alternative #2 would be approximately 4,365 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

D.5.7.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

D.5.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Similar to the proposed project, the reconfigured alternative would transmit power to the grid through the SCE Red Bluff substation. It would require the same infrastructure as the proposed project, including the transmission line, road access, gas pipeline and internal switchyard. The transmission line, road access, and gas pipeline would remain approximately the same length as for the proposed project. The required linear facility routes would require minor adjustments to accommodate the changed solar field configurations. The reconfigured alternative would have the same impacts on transmission system reliability as the proposed project.

D.5.7.3 CEQA LEVEL OF SIGNIFICANCE

As stated above, the reconfigured alternative is evaluated in this RSA because it would reduce some impacts of the project. Additionally, the reconfigured alternative would allow the applicant to contribute clean, renewable energy to help meet the state's energy goals, while minimizing impacts to the desert environment.

D.5.8 RECONFIGURED ALTERNATIVE #3

The Reconfigured Alternative #3 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Unit 1 by changing its shape, as illustrated in **Alternatives Figure 1C**. The solar Unit 2 would remain as proposed for the

proposed project. The overall disturbance area for Reconfigured Alternative #3 would be approximately 4,330 acres.

This alternative is analyzed because:

- It would retain the 500 MW generation capacity defined for the proposed project and the engineering is feasible;
- It would not require use of private land not currently controlled by the applicant;
- It would reduce impacts to the sand dune habitat and the Mojave Fringe-Toed Lizard in the northeastern portion of the site;
- It would reduce impacts to the sand transport corridor.

D.5.8.1 SETTING AND EXISTING CONDITIONS

The proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern half of the proposed field. It would result in a triangular shaped field trending southeast. This reconfigured eastern solar field would be located on primarily on public land managed by BLM; however, as with the proposed project, it include a 40 acre private parcel on which the applicant has a purchase option. It would locate the solar field closer to I-10, approximately 500 feet at the nearest point. The setting for Unit 1 would be the similar as that for the proposed project.

This alternative includes use of the proposed Unit 2 (the western solar field) in the same location as for the proposed project. The setting for Unit 2 would be the same as that for the proposed project.

D.5.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Similar to the proposed project, the reconfigured alternative would transmit power to the grid through the SCE Red Bluff substation. It would require the same infrastructure as the proposed project, including the transmission line, road access, gas pipeline and internal switchyard. The transmission line, road access, and gas pipeline would remain approximately the same length as for the proposed project. The required linear facility routes would require minor adjustments to accommodate the changed solar field configurations. The reconfigured alternative would have the same impacts on transmission system reliability as the proposed project

D.5.8.3 CEQA LEVEL OF SIGNIFICANCE

As stated above, the reconfigured alternative is evaluated in this RSA because it would reduce some impacts of the project. Additionally, the reconfigured alternative would allow the applicant to contribute clean, renewable energy to help meet the state's energy goals, while minimizing impacts to the desert environment.

D.5.9 NO PROJECT/NO ACTION ALTERNATIVES

No Project/No Action Alternative #1:

No Action on Palen Solar Power Project application and CDCA Land Use Plan

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no ground disturbance. Because the project would not be built, the proposed interconnection would not be required and no impacts to safe and reliable electric power transmission would occur. However, the land on which the project is proposed would become available for other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

No Project/No Action Alternative #2:

No Action on Palen Solar Power Project and amend the CDCA Land Use Plan to make the area available for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. The different solar technology would require a transmission line and laws, ordinances, regulations, and standards required for safe and reliable electric power transmission would be similar to those under the proposed project.

No Project/No Action Alternative #3:

No Action on Palen Solar Power Project application and amend the CDCA Land Use Plan to make the area unavailable for future solar development

Under this alternative, the proposed Palen Solar Power Project would not be approved by the Energy Commission and BLM, and BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction of a solar facility. Therefore, the proposed transmission line would not be required and no impacts to safe and reliable electric power transmission would occur. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

D.5.10 PROJECT-RELATED FUTURE ACTIONS - TRANSMISSION SYSTEM ENGINEERING

In order to transmit the power generated at the Palen Solar Power Project to the electricity grid, a new substation is required. Southern California Edison Company will construct and operate the substation, which will allow the electricity to be carried by the Devers–Palo Verde No. 1 (DPV1) 500 kV transmission line.

The SCE Red Bluff Substation is a reasonably foreseeable project if the PSPP is approved and constructed as proposed. Therefore, this section examines the potential impacts of the construction and operation of the proposed substation. This substation would allow interconnection of the PSPP and other renewable projects in the Desert Center area.

The SCE Red Bluff Substation project will be fully evaluated in a future EIS prepared by the BLM. Because detailed design information is not yet available for the Red Bluff Substation, the impact analysis presented here is based on available information. The purpose of this analysis is to inform the Energy Commission, BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the PSPP.

The project components and construction activities associated with this substation are described in Section B.3 of this RSA, and a map of its location is presented as **Figure B.3-1**. This analysis examines the construction and operational impacts of a 230/500 kV substation that would be located on approximately 90 acres, south of Interstate 10 and southeast of Desert Center. Substation components will include 230 kV and 500 kV lines, 230/ 500 kV transformer banks, associated switchracks, and a microwave tower. The substation would be located in an existing CDCA utility corridor, north of and adjacent to the existing DPV1 500 kV transmission line.

D.5.10.1 ENVIRONMENTAL SETTING

The Red Bluff Substation would be located adjacent to a major transmission corridor, currently occupied by the 500 kV DPV1 transmission line and the 230 kV Blythe Energy Project Transmission Line. Additional transmission lines are planned for this corridor, including the Devers–Palo Verde No. 2 line and the Desert Southwest Transmission Line.

D.5.10.2 ENVIRONMENTAL IMPACTS

Construction activities would occur in a manner that complies with applicable safety and reliability standards in order to increase transmission capacity. The Red Bluff Substation

would be designed to CPUC General Order 95 standards. Specific documents that will be presented in SCE's Application and PEA to the CPUC will give specifications for the substation, including engineering drawings and construction guidelines. Plan and Profile drawings and Technical Specifications will also be part of the supplement documents.

During construction, applicable safety and reliability LORS must be met following SCE's Construction Standards, which reflect CPUC requirements. SCE would schedule any outages in a manner that maintains system reliability. Applicable LORS also include North American Electric Reliability Council (NERC) Planning Standards, Western Electric Coordinating Council (WECC) Reliability Criteria, which ensure continuity of load service and protection of the interconnected grid, and the NESC 1999 standards.

All of SCE's electrical and telecommunication upgrades would result in local system benefits, in that they would provide considerably greater flexibility in routing power in the regional transmission network, even if PSPP is not built. The SCE project would ensure that PSPP could generate at its rated capacity.

D.5.10.3 MITIGATION

To mitigate potential safety and reliability impacts, the above-stated LORS, CPUC and NESC regulations and SCE scheduling protocols would be used. SCE would need to assure conformance with the above safety and reliability requirements.

D.5.10.4 CONCLUSION

Conformance with applicable safety and reliability is required by several LORS, and would be successful in mitigating any safety or reliability implications of the upgrades.

D.5.11 CUMULATIVE IMPACTS

Staff has reviewed the list of existing and foreseeable projects as presented in the Cumulative Scenario section of this RSA. Staff's review considers whether the interconnection of PSPP to SCE's transmission system along with other existing and foreseeable generation projects would conform to all LORS required for safe and reliable electric power transmission. The analysis described above under the heading Scope of the Transition Cluster Phase I and Phase II Interconnection Studies is conducted in coordination with, and with the approval of, the California ISO to consider existing and proposed generator interconnections to the transmission grid and the potential safety and reliability impacts under a number of conservative contingency conditions.

The cumulative marginal impacts to the safe and reliable operation of the transmission system due to the PSPP project, as identified in the Phase II Study, would be mitigated with the Energy Commission's and BLM's incorporation of the mitigation measures and Conditions of Certification set forth in this section.

D.5.12 COMPLIANCE WITH LORS

The proposed interconnection facilities including the PSPP 230 kV Central switchyard, generator 230 kV overhead tie line to the new SCE Red Bluff 230 kV substation, and its

termination at the new 230 kV substation are adequate in accordance with industry standards and good utility practices, and are acceptable to staff. Staff proposed conditions of certification TSE-1 through TSE-7 would help ensure that construction operation of the transmission facilities for the proposed PSPP would comply with applicable LORS.

D.5.13 PROPOSED CONDITIONS OF CERTIFICATIONS/MITIGATION MEASURES

TSE-1 The project owner shall furnish to the CPM and to the 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 Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: Prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO 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 below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

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 Before the start of construction, the project owner shall assign to the project an electrical engineer and at least one of each of the following:

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 and 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 either a civil engineer or a 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, or 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 as required by 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 the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earth work and require changes; if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earth work 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: Prior to the start of rough grading, 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 the CPM of the CBO's approvals of the 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 name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within 5 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 (2001 California Building Code, 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 refer to 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 the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within 5 days, the reason for the disapproval, along with the revised corrective action required to obtain the CBO's approval.

TSE-4 For the power plant switchyard, outlet line and termination, the project owner shall not begin any construction until plans for that increment of construction 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:

a) receipt or delay of major electrical equipment;

b) testing or energization of major electrical equipment; and

c) the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: Prior to the start of each increment of construction, 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, and outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer verifying compliance with all applicable LORS, and send 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, and 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. Once approved, the project owner shall inform the CPM and CBO of any anticipated changes to the design, and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

a) The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 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.

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

c) 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.

d) The project conductors shall be sized to accommodate the full output of the project.

e) Termination facilities shall comply with applicable SCE interconnection standards.

f) The project owner shall provide to the CPM:

   i) The Special Protection System (SPS) sequencing and timing if applicable,

   ii) A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable, and

   iii) A copy of the executed LGIA signed by the California ISO and the project owner.

Verification: Prior to the start of construction or start of modification of transmission facilities, the project owner shall submit to the CBO for approval:

1. Design drawings, specifications, and calculations conforming with CPUC General Order 95 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, 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"[2] 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 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;
3. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in charge, a route map, and an engineering description of the equipment and configurations covered by requirements **TSE-5** a) through f);
4. The Special Protection System (SPS) sequencing and timing if applicable shall be provided concurrently to the CPM.
5. A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable,

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

6. The final Phase II Study, including a description of facility upgrades, operational mitigation measures, and/or special protection system sequencing and timing if applicable, and
7. A copy of the executed LGIA signed by the California ISO and the project owner.

Prior to the start of construction of or modification of transmission facilities, the project owner shall inform the CBO and the CPM of any anticipated changes to the design that are different from the design previously submitted and approved and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

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:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and
2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the California ISO shall be provided electronically to 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 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 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 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”, and applicable interconnection standards, NEC, related industry standards.

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 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.

D.5.14 CONCLUSIONS

The proposed interconnection facilities including the PSPP 230 kV Central switchyard, generator 230 kV overhead tie line and its termination at the new SCE Red Bluff 230 kV substation, are acceptable and would comply with applicable laws, ordinances, regulations and standards (LORS).

The Phase II Study identified six mitigation measures required to allow for the reliable operation and delivery of power from the PSPP. Where the mitigation had the potential for significant environmental impacts staff has provided an environmental analysis in Appendix A and Appendix B of this Transmission System Engineering Testimony. Facilities identified in Appendices A and B may require license or approval from the CPUC and/or the Bureau of Land Management.

Staff’s recommended Conditions of Certification TSE-1 to TSE-7 would help ensure that the PSPP transmission facilities comply with applicable LORS.

D.5.15 REFERENCES

California ISO (California Independent System Operator) 1998a – California ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO (California Independent System Operator) 1998b – California ISO Dispatch Protocol posted April 1998.

California ISO (California Independent System Operator) 2002a – California ISO Planning Standards, February 7, 2002.

California ISO (California Independent System Operator) 2007a – California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, March, 2007.

California ISO (California Independent System Operator) 2009a – Large Generator Interconnection Procedures, dated.

California ISO (California Independent System Operator) **2010**a – Cal ISO **(**tn**:57824).** Redacted Phase II Study, dated 7/8/2010

PSPP 2009a – Palen Solar Energy Project. Application for Certification (AFC) for the PSPP, Submitted on 08-30-2009.

PSPP 2009b – Solar Millennium (tn: 54008). Data Adequacy Supplement, dated 10/26/2009

CA ISO Transition cluster Phase 1 Interconnection Study Report dated August 05, 2009. Submitted on 10-09.

NERC (North American Electric Reliability Council) 2006 – Reliability Standards for the Bulk Electric Systems of North America, May 2 2006.

WECC (Western Electricity Coordinating Council) 2006 – NERC/WECC Planning Standards, August 2006.

D.5.16 DEFINITION OF TERMS

ACSR ..... Aluminum cable steel reinforced.

AAC ..... All Aluminum conductor.

ACSS ..... Aluminum conductor steel-supported.

Ampacity ..... Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.

Ampere ..... The unit of current flowing in a conductor.

Kiloampere (kA) ..... 1,000 Amperes

Bundled ..... Two wires, 18 inches apart.

Bus ..... Conductors that serve as a common connection for two or more circuits.

Conductor ..... The part of the transmission line (the wire) that carries the current.

Congestion ..... Congestion management is a scheduling protocol, which provides that

Management ..... dispatched generation and transmission loading (imports) would not violate criteria.

Emergency Overload. See Single Contingency. This is also called an L-1.

Hertz ..... The unit for System Frequency.

Kcmil or KCM..... Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.

Kilovolt (kV) ..... A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground. 1,000 Volts.

Loop ..... An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.

MVAR or ..... Megavolt Ampere-Reactive. One million Volt-Ampere-Reactive.

Megavars..... Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt..... A unit of apparent power, equals the product of the line voltage

Ampere (MVA) ..... in kilovolts, current in amperes, the square root of 3, and divided by 1000.

Megawatt (MW) ..... A unit of power equivalent to 1,341 horsepower.

Normal Operation/Normal Overload

When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

N-1 Condition..... See Single Contingency.

Outlet..... Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power Flow Analysis . A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.

Reactive Power..... Reactive power is generally associated with the reactive nature of inductive loads like motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

Remedial Action ..... A remedial action scheme is an automatic control provision,

Scheme (RAS) ..... which, for instance, would trip a selected generating unit upon a circuit overload.

SSAC ..... Steel Supported Aluminum Conductor.

SF6..... Sulfur hexafluoride is an insulating medium.

Single ..... Also known as emergency or N-1 condition, occurs when one

Contingency ..... major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid Dielectric ..... Copper or aluminum conductors that are insulated by solid

Cable polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

SVC..... Static VAR Compensator: An equipment made of Capacitors and Reactors with electronic controls for producing and controlling Reactive Power in the Power System.

Switchyard ..... A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.

Thermal rating ..... See ampacity.

TSE ..... Transmission System Engineering.

TRV ..... Transient Recovery Voltage

Tap..... A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.

Undercrossing..... A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild ..... A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

VAR..... Voltage Ampere Reactive, a measure for Reactive power in the power system.

E – GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Dale Rundquist

E.1 INTRODUCTION

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated, and closed in compliance with public health and safety, environmental, and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law. The Public Resources Code section 25806(d), states that renewable energy projects are exempt from paying an annual compliance fee.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of 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 the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions of certification;
- establish requirements for facility closure plans; and
- specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure below a level of significance. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

In addition to meeting the Energy Commission's Conditions of Certification, the project owner will be required to comply with all terms and conditions required by the Bureau of Land Management (BLM), as will be described in the BLM's Record of Decision and Right-of-Way Grant documents for this project.

E.2 DEFINITIONS

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

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/or light vehicles is allowable during site mobilization.

CONSTRUCTION

Onsite 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 the power plant 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.

E.3 COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

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 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; and
5. ensuring that compliance files are maintained and accessible.

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

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management. All submittals must include searchable electronic versions (PDF or MS Word files).

E.4 CHIEF BUILDING OFFICIAL RESPONSIBILITIES

The Chief Building Official (CBO) shall serve as the Energy Commission's delegate to assure the project is designed and constructed in accordance with 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 the Energy Commission's delegate including reporting noncompliance issues or violations to the CPM 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 the CPM.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM usually schedules 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 both the Energy Commission’s and project owner’s technical staff to review the status of all pre-construction or pre-operation requirements contained in 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 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.

ENERGY COMMISSION RECORD

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 the Energy Commission; and
- All petitions/requests for project or condition of certification changes and the resulting Energy Commission action.

E.5 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 the 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 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.

E.6 COMPLIANCE MITIGATION MEASURES/CONDITIONS OF CERTIFICATION

UNRESTRICTED ACCESS (COMPLIANCE-1)

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 the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves 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 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.

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 the CPM.

Verification of compliance with the conditions of certification can be accomplished by the following:

1. monthly and/or annual compliance reports, 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. Energy Commission staff audits of project records; and/or
4. 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 Energy Commission submittal number.

The project owner is responsible for the delivery and content of all verification submittals to the 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 as follows:

Dale Rundquist
Compliance Project Manager
(09-AFC-7C)
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 the CPM.

If the project owner desires 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 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.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient 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 the Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of 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 the CPM in the monthly or annual compliance reports.

COMPLIANCE MATRIX (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide 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), CPM, or delegate agency, if applicable;
7. the compliance status of each condition, e.g., “not started,” “in progress” or “completed” (include the date); and
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 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. The Key Events List form is found at the end of these General Conditions.**

During pre-construction and construction of the project, 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;
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 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 the CPM.

ANNUAL COMPLIANCE REPORT (COMPLIANCE-7)

After construction is complete, 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 the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project, unless otherwise specified by 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 approved by the Energy Commission or cleared by 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 Executive Director 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.

REPORTING OF COMPLAINTS, NOTICES, AND CITATIONS (COMPLIANCE-9)

Prior to the start of construction, the project owner must send a letter to property owners living within 1 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 a 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 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 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 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).

E.7 FACILITY CLOSURE

At some point in the future, 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 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.

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.

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.

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.

E.8 COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

PLANNED CLOSURE (COMPLIANCE-10)

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 proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to the commencement of closure activities. The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

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 remnants that will remain at 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. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and
4. 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.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner 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 plan's approval, or if the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or 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 the Energy Commission approves the facility closure plan.

UNPLANNED TEMPORARY CLOSURE/ON-SITE CONTINGENCY PLAN (COMPLIANCE-11)

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 CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. 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 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 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 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 the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

UNPLANNED PERMANENT CLOSURE/ON-SITE CONTINGENCY PLAN (COMPLIANCE-12)

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 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 the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

POST CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION: AMENDMENTS, OWNERSHIP CHANGES, STAFF APPROVED PROJECT MODIFICATIONS AND VERIFICATION CHANGES (COMPLIANCE-13)

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. **It is the responsibility of the project owner to contact 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 Energy Commission, or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

A petition is required for **amendments** and for **staff approved project modifications** as specified below. Both shall be filed as a “Petition to Amend.” Staff will determine if the change is significant or insignificant. 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 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 final decision, which requires public notice and review of the Energy Commission staff analysis and approval by the full 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 a sample petition to use as a template.

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. 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 a sample petition to use as a template.

STAFF APPROVED PROJECT MODIFICATION

Modifications that do not result in deletions or changes to conditions of certification, that are compliant with laws, ordinances, regulations and standards and will not have significant environmental impacts may be authorized by the CPM as a staff approved project modification pursuant to section 1769(a) (2). Once staff files an intention to approve the proposed project modifications, any person may file an objection to staff's determination within 14 days of service on the grounds that the modification does not meet the criteria of section 1769 (a)(2). If a person objects to staff's determination, the petition must be processed as a formal amendment to the decision and must be approved by the full commission at a noticed business meeting or hearing.

VERIFICATION CHANGE

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification.

E.9 CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

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.

E.10 ENFORCEMENT

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 an 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 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 finds 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

noncompliance with a 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.

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner shall grant 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. 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 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 1 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, • the CPM has issued a letter to the project owner authorizing construction.
COMPLIANCE-5	Compliance Matrix	A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report
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.
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 the Energy Commission's Executive Director with a request for confidentiality.

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-9	Reporting of Complaints, Notices, and Citations	Prior to the start of construction, the project owner must send a letter to property owners living within 1 mile of the project notifying them of a telephone number to contact project representatives with questions, complaints, or concerns
COMPLIANCE-10	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-11	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 prior to commencement of commercial operation.
COMPLIANCE-12	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Post-certification changes to the Decision	The project owner must petition the Energy Commission 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 1
COMPLAINT REPORT / RESOLUTION FORM

Complaint Log Number:_____ Docket Number:_____

Project Name:_____

COMPLAINANT INFORMATION

Name:_____ Phone Number:_____

Address:_____

COMPLAINT

DATE COMPLAINT RECEIVED:_____ TIME COMPLAINT RECEIVED:_____

COMPLAINT RECEIVED BY: ☐ TELEPHONE ☐ IN WRITING (COPY ATTACHED)

DATE OF FIRST OCCURRENCE:_____

DESCRIPTION OF COMPLAINT (INCLUDING DATES, FREQUENCY, AND DURATION):_____

_____

_____

FINDINGS OF INVESTIGATION BY PLANT PERSONNEL:_____

_____

_____

DOES COMPLAINT RELATE TO VIOLATION OF A CEC REQUIREMENT? ☐ YES ☐ NO

DATE COMPLAINTANT CONTACTED TO DISCUSS FINDINGS:_____

DESCRIPTION OF CORECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION:_____

_____

_____

DOES COMPLAINTANT AGREE WITH PROPOSED RESOLUTION? ☐ YES ☐ NO

IF NOT, EXPLAIN:_____

_____

CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED:_____

DATE FIRST LETTER SENT TO COMPLAINTANT (COPY ATTACHED):_____

DATE FINAL LETTER SENT TO COMPLAINTANT (COPY ATTACHED):_____

OTHER RELEVANT INFORMATION:_____

_____

_____

"This information is certified to be correct."

PLANT MANAGER SIGNATURE:_____ DATE:_____

(ATTACH ADDITIONAL PAGES AND ALL SUPPORTING DOCUMENTATION, AS REQUIRED)

F. LIST OF PREPARERS

PALEN SOLAR POWER PROJECT
LIST OF PREPARERS

Executive Summary ..... Alan Solomon

Introduction ..... Alan Solomon

Proposed Project and Alternatives ..... Alan Solomon and Susan V. Lee

Cumulative Scenario ..... Susan V. Lee

Air Quality ..... Joseph Hughes and William Walters, P.E.

Biological Resources ..... Carolyn Chainey-Davis, Amy Golden, Sara Keller, Mark Massar, and Susan Sanders

Cultural Resources and Native American Values ..... Kim Tremaine and George Kline

Hazardous Materials Management ..... Alvin Greenberg, Ph.D.

Health and Safety ..... Alvin Greenberg, Ph.D.

Land Use, Recreation, and Wilderness ..... Mark Hamblin

Noise and Vibration ..... Shahab Khoshmashrab

Socioeconomics and Environmental Justice ..... Scott Debauche

Soil and Water Resources ..... Michael Daly, Michael Donovan and John Thornton

Traffic and Transportation ..... Andrea Koch and James Jewell

Transmission Line Safety and Nuisance ..... Obed Odoemelam, Ph.D.

Visual Resources ..... Michael Clayton

Waste Management ..... Suzanne Phinney, D.Env.

Worker Safety and Fire Protection ..... Alvin Greenberg, Ph.D.

Facility Design ..... Shahab Koshmashrab

Geology, Paleontology and Minerals ..... Patrick A. Pilling, Ph.D., P.E., G.E., D.GE.

Power Plant Efficiency ..... Erin Bright

Power Plant Reliability ..... Erin Bright

Transmission System Engineering ..... Sudath Edirisuriya and Mark Hesters

General Conditions ..... Dale Rundquist

Project Assistant ..... Hilarie Anderson

G. WITNESS QUALIFICATIONS AND DECLARATIONS

DECLARATION OF
Alan H. Solomon

I, **Alan H. Solomon**, declare as follows:

1. I am presently employed by The California Energy Commission in the **California Energy Commission, Siting Division** as a **Planner III**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Executive Summary and Introduction** for the **Palen Solar Power Plant**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 15, 2010 Signed: _____

At: Sacramento, CA

Alan H. Solomon

Career Experience:

State of California, California Energy Commission
Project Manager, STEP — Oct 2008-Present
Conduct analyses of proposed or potential site areas; develop and recommend goals and objectives for a statewide facility siting program; develop, analyze and evaluate alternative facility siting plans; write research reports and prepare progress reports on plans; coordinate and review energy facility siting standards, conditions, and guidelines with Federal, State, regional, and local agencies, and related organizations involved with energy facility siting; conduct public hearings and work with residents. Working team leader or lead person over a group of specialists on complex projects.

State of California, Department of Mental Health
Ombudsman, System of Care — Nov 2005-Oct 2008
Lead person for the Department of Mental Health's Office of the Ombudsman. Assist people with their mental health concerns and questions. Making recommendations to policy decision makers. Conduct presentations and act as public liaison with outside mental health organizations. Work with internal Department of Mental Health staff in addressing countywide areas of concern. Analyze policy and legislation. Research compliance and regulatory issues, write reports, problem solving, and training.

State of California, Department of Social Services
Program Consultant, Office of Child Abuse Prevention — Sept 2004-Nov 2005
Assist with the development of the CWS Redesign within the State of California. Facilitate meetings related to the Differential Response aspect of the CWS Redesign, (these meetings include general Workgroup meetings, as well as, the Community Partnership, CWS/CMS Database, and Evaluation Task Groups). Assist on the Citizen Review Panel Workgroup. Analyze Child Welfare Services policy and legislation. Research compliance and regulatory issues. Develop databases and survey mechanisms. Write reports, issue papers, and All County Letters. Problem solving and public liaison.

State of California, Department of Health Services
Program Consultant, WIC Branch — Nov 2003-Sept 2004
Working with local and CBO WIC agencies. Tracking information, contract management, and ensuring quality assurance. Investigate alleged problems and assist the public with their problems, questions, concerns, special needs, and correspondence. Analyze policy and legislation. Research compliance and regulatory issues. Write reports, problem solving, public liaison, and staff/county training.

State of California, Department of Social Services
Program Consultant, Children's Services Operations Bureau — April 2000- Nov 2003
Assist Californian Counties with Children's Welfare Services (CWS) concerns, issues, and training. Assist the public with their CWS problems, questions, concerns, special needs, and correspondence. Investigate alleged problems within County CWS systems and child death issues. Analyze Child Welfare Services policy and legislation.

County of Sacramento, Department of Human Assistance
Human Services Specialist /Russian Community Liaison — Oct 1995-April 2000
Develop and conduct public assistance training; active participant on the School Attendance Review Board (SARB) Hearings; truancy sweeps; and, leadperson for Eligibility Trainees. Liaison between DHA and former Soviet Community; writing a bi-weekly column for a Russian-language newspaper; public relations; problem solving; and, community outreach.

Certified in Russian Language and Culture

DECLARATION OF
Susan V. Lee

I, **Susan V. Lee**, declare as follows:

1. I am presently employed by **Aspen Environmental Group** in the **San Francisco Office** as a **Senior Associate/Vice President**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Alternatives** and **Cumulative Scenario**, for the **Palen Solar Power Project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 2, 2010 Signed: Susan Lee

At: San Francisco, CA

SUSAN V. LEE

Vice President, San Francisco Operations

ACADEMIC BACKGROUND

M.S., Applied Earth Science, Stanford University, 1984
B.A., Geology, Oberlin College, 1977

PROFESSIONAL EXPERIENCE

Ms. Lee has over 25 years of technical and managerial experience in environmental assessment, and she currently manages Aspen's San Francisco Office. Her expertise is in management of environmental assessment for infrastructure and energy projects (renewable energy projects, electric transmission lines, pipelines, and gas-fired power plants) under both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Ms. Lee has managed preparation of several major controversial transmission line and pipeline siting EIR/EISs, including the Sunrise Powerlink, Path 15, Jefferson-Martin, Tri-Valley, and Devers–Palo Verde No. 2. Prior to employment at Aspen, Ms. Lee worked for 10 years with the Federal government [the U.S. Minerals Management Service (MMS) and the U.S. Geological Survey (USGS)].

Ms. Lee has worked for Aspen Environmental Group since 1993. She has contributed to both technical and project management aspects of Aspen's environmental projects, including the following:

- **California Energy Commission**. Ms. Lee has supported CEC staff since the fall of 2000. To date, she has prepared analyses for 14 power plants throughout the State, and she has also contributed to several special project reports. She has participated in numerous public workshops and hearings around the state, and completed the CEC's Expert Witness Training. Her major efforts for the CEC include the following:
  - Ms. Lee is managing the Alternatives and Cumulative impact analyses for several solar thermal projects on public lands, coordinating NEPA issues with BLM staff and CEQA issues with the Energy Commission's Project Manager.
  - Ms. Lee managed preparation of the CEC's first comprehensive dry cooling analysis for a coastal power plant using once-through cooling, the **Morro Bay Power Plant Modernization Project**. She managed a team of authors who developed a preliminary cooling design, and provided impact analysis.
  - Ms. Lee has prepared staff assessment **Alternatives Analyses** (consistent with CEQA and the CEC's procedures) for the CEC's staff reports considering proposed new or re-powered power plants at South Bay (San Diego), Blythe (BEP II), Morro Bay, El Segundo, Avenal, San Joaquin Valley, Potrero Unit 7 (San Francisco), Tracy, East Altamont, Henrietta, and the San Francisco Electric Reliability Project. She also prepared the alternatives analysis for the CEC's Blythe Transmission Modifications Project. In addition to preparing staff assessment sections documenting comparative impacts of alternatives, this work includes making presentations at PSA Workshops and testifying at Evidentiary Hearings.
  - Ms. Lee managed a three-year transmission corridor modeling project, **Planning Alternative Corridors for Transmission (PACT)**, in conjunction with the CEC PIER Environmental Program. The model uses Geographic Information Systems and decision modeling to assist in comparing potential alternative transmission corridors. Aspen's work included overall contract management, as well as development and management of a Project Steering Committee and six Technical Advisory Groups.
  - Ms. Lee prepared a detailed Background Report and made a presentation at an Energy Commission workshop on "**Comparative Alternatives to Transmission**" as part of the Integrated Energy Policy Report (IEPR) 2004 Update process. This project evaluated non-wires alternatives to transmission lines;

ongoing work is related to development of a methodology for consideration of these alternatives as part of the transmission planning process.

- Ms. Lee served as the CEC's **Project Manager** for the Small Power Plant Exemption (SPPE) environmental review process for the Woodland Generation Station 2, an 80-megawatt power plant proposed by the Modesto Irrigation District.
- Ms. Lee managed preparation of **Power Plant Cooling Options Reports** for the Potrero Unit 7 Project, Morro Bay, SMUD Cosumnes, and El Segundo power plants. These analyses include conceptual design of dry cooling systems, hybrid cooling systems, and water supply options including use of reclaimed water in both once through and hybrid cooling systems.
- Ms. Lee has provided management and technical support to Aspen's preparation of several reports for the CEC: the Environmental Performance Report, the Coastal Power Plant Study, and the Alternative Generation Technology study.

- **California Valley Solar Ranch EIR.** Under contract to San Luis Obispo County, Ms. Lee is managing preparation of an EIR to evaluate development of a 250 MW solar photovoltaic power facility on nearly 4,000 acres in the Carrizo Plain.
- **SDG&E Sunrise Powerlink Transmission Project EIR/EIS**. Under a $14 million contract to the CPUC, and under a Memorandum of Understanding with the Bureau of Land Management (BLM), Ms. Lee managed preparation of an EIR/EIS for a highly controversial 150-mile transmission line from Imperial County to coastal San Diego County.
- **SCE Devers–Palo Verde No. 2 Transmission Line Project EIR/EIS**. Under contract to the CPUC, Ms. Lee managed preparation of an EIR/EIS to evaluate the impacts of a constructing a 230-mile 500 kV transmission line between the Palo Verde generating hub in Arizona and SCE's Devers Substation.
- **Long-Term Procurement Planning and Barriers to Renewable Power Implementation**. For the CPUC, Ms. Lee and a team of environmental and economic specialists developed environmental and economic data and developed timelines of permitting and barriers to implementing the proposed 33 percent Renewable Portfolio Standard, including ranking and screening of available energy resources.
- **Jefferson-Martin 230 kV Transmission Line Project**. Ms. Lee managed preparation of an EIR for PG&E's proposed 27-mile transmission line through scenic San Mateo County in the Highway 280 corridor, urban Colma and Daly City, and across San Bruno Mountain for the California Public Utilities Commission (CPUC).
- **PG&E Northeast San Jose Transmission Reinforcement Project**: Ms. Lee served as the Project Manager for this CPUC contract to evaluate PG&E's proposed transmission improvements in Santa Clara and Alameda Counties.
- **PG&E Tri-Valley 2002 Capacity Increase Project.** Ms. Lee managed preparation of the Draft and Final EIRs for this controversial and complex project during 2000 and 2001, which was certified by the CPUC in May 2001. The Draft EIR (over 800 pages) evaluated proposed transmission lines and substations in the Tri-Valley area (Cities of Pleasanton, Dublin, Livermore, and San Ramon) of Alameda and Contra Costa Counties, and responded to a high level of local concern regarding electric and magnetic fields (EMFs).

DECLARATION OF

I, Joseph Hughes declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Air Resources Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony and errata on **Air Quality** for the **Palen Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8.26.10 Signed: _____

At: Sacramento, California

Joseph Hughes

Education

Sacramento State University 2003-2008
Sacramento, Ca

***Bachelor of Science, Mechanical Engineering Technology, 3.25GPA**-May 2008*

AA degree in liberal arts and science 3.0 GPA

Experience

California Energy Commission March 2009-Present
Sacramento, Ca

Air Resources Engineer

- Currently co-authoring air quality staff assessments for thermal power plant projects in California producing more than 50 mega-watts of electricity.
- Currently working on American Recovery and Reinvestment Act (ARRA) projects, along with natural gas fired projects.
- Review and process compliance reports for multiple power plants in California.
- Currently working on project amendments and modifications requiring air quality analysis.
- Trained in CEQA and NEPA analysis, along with AERMOD air modeling.

Capital Engineering Consultants, Inc April 2008-2009
Sacramento, Ca

Mechanical Engineer

- Responsible for detailed and accurate take off calculations to ensure successful project completion.
- Completing engineering design for Heating Ventilation Air Conditioning and Plumbing by utilizing complex engineering calculations and software.
- Responsible for meeting code regulation and requirements to the degree acceptable by various organizations.
- Lead productive weekly team meetings to discuss project scheduling, cost effectiveness, request for information, and change orders.

DECLARATION OF
Testimony of William Walters, P.E.

I, **William Walters,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission's Siting,Transmission and Environmental Protection Division, as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Air Quality** and **Greenhouse Gases** for the **Palen Solar Power Project Revised Staff Assessment** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 29, 2010 Signed: _____

At: Agoura Hills, California

RECEIVED BY
AUG 02 2010
CHIEF COUNSEL OFFICE

WILLIAM WALTERS, P.E.
Air Quality Specialist

ACADEMIC BACKGROUND
B.S., Chemical Engineering, 1985, Cornell University

PROFESSIONAL EXPERIENCE

Mr. Walters has over 20 years of technical and project management experience in environmental compliance work, including environmental impact reports, RCRA/CERCLA site assessment and closure, site inspection, source monitoring, emissions inventories, source permitting, and energy and pollution control research.

Aspen Environmental Group — 2000 to present

Responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- **Engineering and Environmental Technical Assistance to Conduct Application for Certification Review for the California Energy Commission:**
  - Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following California Energy Commission (CEC) licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project (including Expert Witness Testimony); Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project; Colusa Power Project; Inland Empire Energy Center; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project (including Expert Witness Testimony); Avenal Energy Project; San Joaquin Valley Energy Center (including expert witness testimony); Salton Sea Unit 6 Project (including expert witness testimony); Modesto Irrigation District Electric Generation Station (including expert witness testimony); Walnut Energy Center (including expert witness testimony); Riverside Energy Resource Center (including expert witness testimony); Pastoria Energy Facility Expansion; Panoche Energy Center (in progress); Starwood Power Plant (in progress); Bullard Energy Center (in progress).
  - Preparation and project management of the visual plume assessment for the following California Energy Commission (Energy Commission) licensing projects: Metcalf Energy Center Power Project (including Expert Witness Testimony); Contra Costa Power Plant Project (including Expert Witness Testimony); Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center (including expert witness testimony); Russell City Energy Center; SMUD Cosumnes Power Plant Project (including expert witness testimony); Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; Roseville Energy Park; City of Vernon Power Plant (in progress); South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant (in progress); Colusa Generating Station; and Russell City Energy Center (in progress).
  - Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment (in progress); Eastshore Energy Power Plant; and the Blythe Energy Power Plant and Blythe Energy Project Phase II (including expert witness testimony) siting cases. Assistance in the aircraft safety review of thermal and visual plumes of the operating Blythe Energy Power Plant.

- Preparation of a white paper on methods for the determination of vertical plume velocity determination for aircraft safety analyses.
- Preparation and instruction of a visual water vapor plume modeling methodology class for the CEC.
- Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 Energy Commission licensing project.
- Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; and Salton Sea Unit 6 Project.
- Preparation of the air quality section of the staff paper "A Preliminary Environmental Profile of California's Imported Electricity" for the Energy Commission and presentation of the findings before the Commission.
- Preparation of the staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
- Completion of an audit of power plant cost factors for integration into the Energy Commission Cost of Generation Model.

- For the **Los Angeles Department of Water and Power (LADWP)**:
  - Preparation of the Air Quality Inventory for the LADWP River Supply Pipeline Project EIR.
  - Project management and preparation of the Air Quality Section for the LADWP Valley Generating Station Stack Removal IS/MND support project.
- For the **Department of Water Resources (DWR)**:
  - Preparation of the Air Quality sections for two separate DWR Santa Ana Valley Pipeline Repairs Project CEQA Categorical Exemption Memorandums.
  - Preparation of the emission estimates used in the Air Quality Sections for the DWR Tehachapi Second Afterbay Project Initial Study and EIR.
- For the **U.S. Army Corps of Engineers (Corps)**:
  - Preparation of the Air Quality Section and General Conformity Analysis for the Matilija Dam Ecosystem Restoration Project EIS/R for the Corps.
  - Preparation of emission inventory and General Conformity Analysis of the Murrieta Creek Flood Control Project and the Joint Red Flag exercise to be conducted in the Nevada Test and Training Range.
  - Emission inventory for the construction activities forecast for the San Jose/Old San Jose Creeks Ecosystem Restoration project for the Corps.
- For **Los Angeles Unified School District (LAUSD)**:
  - Preparation of the Air Quality Section of the LAUSD New School Construction Program EIR and provided traffic trip and VMT calculation support for the Traffic and Transportation Section.
  - Management and preparation of the Draft Air Quality Sections for the Reseda Senior High School Portable Addition IS/MND and Wonderland Elementary Addition IS/MND projects for LAUSD.
- Other Projects:
  - Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.

- Preparation of the Air Quality section of the PG&E Hydrodivestiture Draft EIR/EIS for the California Public Utilities Commission (CPUC).
- Preparation of the Air Quality Section of the Environmental Information Document in support of the Coastal Consistency Determinations for the suspension of operation requests for undeveloped units and leases off the Central California Coast.
- Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.

Camp Dresser & McKee, Inc. **1998 to 2000**

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Preparation of emission inventories and dispersion modeling for criteria and air toxic pollutants for the Los Angeles International Airport Master Plan (LAXMP) EIS/EIR.
- Project Manager/Technical lead for the completion of air permit applications and air compliance audits for two Desa International fireplace accessory manufacturing facilities located in Santa Ana, California.
- Project manager/technical lead for the completion of Risk Management Plans (RMPs) for four J.R. Simplot food processing facilities in Oregon, Idaho, and Washington and the Consolidated Reprographics facility located in Irvine, California.

Planning Consultants Research **1997 to 1998**

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Project Manager for a stationary source emission audit of the entire Los Angeles International Airport complex for Los Angeles World Airports (LAWA) in support of the LAXMP.
- Review of the Emission Dispersion Modeling System (EDMS) and preparation of a report with findings to the Federal Aviation Administration for LAWA in support of the LAXMP.
- Project manager for the ambient air monitoring and deposition monitoring studies performed for LAWA in support of the LAXMP, including the selection of the monitoring sites and specialty subcontractor, and review of all monitoring data.

Aspen Environmental Group/Clean Air Solutions **1995 to 1996**

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Manager of the Portland, Oregon, office of Clean Air Solutions from March 1995 to December 1995, with responsibilities including Project Management, Business Development, and Administration.
- Control technology assessment, engineering support and Notice of Intent to construct preparation for J.R. Simplot's Hermiston, Oregon, food processing facility. Review and revision of an Air Contaminant Discharge Permit application, Title V permit application, and PSD modeling analysis for J.R. Simplot's Hermiston facility.

- Air quality compliance report including an air emission inventory, regulation and permit compliance determination, and recommendations for compliance for Lumber Tech, Inc.'s Lebanon, Oregon, wood products facility.

Fluor Daniel, Inc. **1990 to 1995 and 1996 to 1997**

Mr. Walters was responsible as lead technical or project manager for major environmental projects for both government and private clients. His projects included:

- Prepared several air permit applications for the ARCO Los Angeles Refinery Polypropylene Plant Project; Phase I environmental assessments for properties located in Southern California; and a site investigation and RCRA closure plan for a hazardous waste storage site in Vernon, California.
- Project manager of the Anaconda Smelter site for the U.S. Environmental Protection Agency's (EPA) Alternative Remedial Contract System (ARCS) project during the conclusion of technical activities and project closeout. Prepared a cost recovery report for the project.
- Performed environmental analysis for the Bonneville Power Authority, including air pollution BACT analysis, wastewater analysis, and evaluation of secondary environmental effects of electric power producing technologies.

Jacobs Engineering Group **1988 to 1990**

Mr. Walters was responsible for a wide range of air pollution regulatory and testing projects, including the following:

- Project manager of air toxic emission inventory reports prepared for U.S. Borax's boron mining and refining facility and the Naval Aviation Depot (N. Island Naval Base, San Diego, California).
- Prepared air permit applications and regulatory correspondence for several facilities including the U.S. Department of Energy's Feed Material Production Center uranium processing facility in Fernald, Ohio; Evaluation of a sludge dewatering process at Unocal's Wilmington, California, Refinery; and United Airlines blade repair facility at the San Francisco Airport.
- Characterized and quantified air emissions for offshore oil and gas development activities associated with Federal oil and gas Lease Sale 95, offshore southern California, for the U.S. Minerals Management Service.

CERTIFICATIONS

- Chemical Engineer, California License 5973
- CARB, Fundamentals of Enforcement Seminar
- EPA Methods 1-8, 17; Training Seminar

AWARDS

- California Energy Commission Outstanding Performance Award 2001

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I, **Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the Revised Staff Assessment on the **Public Health, Hazardous Materials Management**, and **Worker Safety/Fire Protection** sections for the **Palen Solar Power Project Application** based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Aug. 11, 2010 Signed: [signature]

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader in the preparation of human and ecological risk assessments, air quality assessments, hazardous materials handling and risk management/prevention, infrastructure vulnerability assessments, occupational safety and health, hazardous waste site characterization, interaction with regulatory agencies in obtaining permits, and conducting lead surveys and studies. He has particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, the intrusion of subsurface contaminants into indoor air, and the preparation and review of public health/public safety sections of EIRs/EISs. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission and has assisted the CEC in the assessment of safety and security issues for proposed LNG terminals. In addition to providing security expertise to the State of California, Dr. Greenberg was the Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 26

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)
September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group
January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions
January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee
September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment
April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee
January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)
January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group
January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992
Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991
Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988
ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987
California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987
Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987
Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986
Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985
Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983
Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present
Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, review and evaluation of EIRs/EISs, preparation of public health and safety sections of EIRs/EISs, and litigation support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984
Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983
Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979

Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979
Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975
Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Hazardous Materials Management and Security, Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Waste Site Characterization, and Toxic Substances Control Policy for over 26 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants, refineries, and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He is presently assisting the California Energy Commission in assessing the risks to workers and the public of proposed power plants and LNG terminals in the state. His experience in hazard identification, exposure assessment, risk assessment, occupational safety and health, emergency response, and Critical Infrastructure Protection has made him a valuable part of the CEC team addressing this issue. He has reviewed and commented on the DEIS/DEIR for the proposed SES LNG Port of Long Beach terminal, focusing on security issues for the CEC and on safety matters for the City of Long Beach. He has presented technical information and analysis to the State of California Interagency LNG Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has been a member of the Squaw Valley Technical Review Committee since 1986 establishing chemical application management plans at golf courses to protect surface and

groundwater quality. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead contaminated soils. Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

Sites with EPA, RWQCB and/or DTSC Oversight

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach, Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of $750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts

from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara. Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

Examples

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)
The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca.
(March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca.
(September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency.
(August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency.
(August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

Military Bases

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine

Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

Examples

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

Liquefied Natural Gas (LNG)

Dr. Greenberg assisted the CEC in the preparation of the "background" report on the risks and hazards of siting LNG terminals in California ("LNG in California: History, Risks, and Siting" July 2003) and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. He has also conducted an evaluation and prepared comments on the risks, hazards, and safety analysis of the DEIS/DEIR for the City of Long

Beach on a proposed LNG terminal at the Port of Long Beach (POLB) and conducted an analysis on vulnerability and critical infrastructure security for the CEC on this same proposed LNG terminal. He currently advises the CEC on the POLB LNG proposal on risks, hazards, human thresholds of thermal exposure, vulnerability, security, and represented the CEC at a U.S. Coast Guard briefing on the Waterway Suitability Assessment that included the sharing of SSI (Sensitive Security Information). He has presented technical information and analysis to the State of California LNG Interagency Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

Infrastructure Security

Since 2002, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the assessment of Critical Infrastructure Protection, threat assessments, criticality assessments, and the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from foreign and domestic terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks, management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan is used by power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He also leads an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, in August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Air Pathway Analysis

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.

Examples

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),
- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

Examples

- Almond 2 Power Plant Project, City of Ceres, Ca. 2009 – present. Public health.
- Watson Cogeneration Steam and Electric Reliability Project, Carson, Ca. 2009 – present. Public health.
- Hanford Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Henrietta Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Lodi Energy Center, Lodi, Cal. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Marsh Landing Generating Station, City of Antioch, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Palmdale Hybrid Power Plant, Palmdale, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- Stirling Energy Systems Solar 1 Project, San Bernardino County, Ca. 2008 – present. Public health.
- Stirling Energy Systems Solar 2 Project, Imperial County, Ca. 2008 – present. Public health.
- San Joaquin Solar 1&2, Fresno County, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- GWF Tracy Combined Cycle Power Plant, Tracy, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- CPV Vaca Station Power Plant, Vacaville, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.

- Willow Pass Generating Station, Pittsburg, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, waste management.
- Avenal Energy Power Plant, Avenal, Ca. 2008 – 2009. Worker safety/fire protection, public health.
- Orange Grove Energy, San Diego County, Ca. 2008-2009. Public health.
- Riverside Energy Resource Center Units 3&4, Riverside, Ca. 2008 – 2009. Hazardous materials management.
- Canyon Power Plant, Anaheim, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Carlsbad Energy Center, Carlsbad, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Ivanpath Solar Electric Generating System, San Bernardino County, Ca. 2007 – present. Public health.
- Kings River Conservation District Community Power Project, City of Parlier, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chula Vista Energy Upgrade Project, Chula Vista, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chevron Richmond Power Plant Replacement Project, Richmond, Ca. 2007 – 2008. Hazardous materials management, public health.
- Humboldt Bay Generating Station, Eureka, Ca. 2006 – 2008. Hazardous materials management, worker safety/fire protection, waste management.
- El Centro Power Plant – Unit 3 Repower Project, El Centro, Ca. 2006 – 2007. Public health.
- San Francisco Energy Reliability Project, San Francisco, Ca. 2004 – 2006. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials

- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR

Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, confined spaces, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms. He is currently the team leader conducting safety and security audits at power plants throughout California for the California Energy Commission. Safety issues audited include compliance with regulations addressing several safety matters, including but not limited to, confined spaces, lockout/tagout, hazardous materials, and fire prevention/suppression equipment.

Examples

Review and Evaluation of Public and Worker Safety Issues at the proposed SES LNG Facility, Port of Long Beach. prepared for the City of Long Beach. (November 2005)

Confidential safety and security audit reports for 18 power plants in California. prepared for the California Energy Commission. (January 2005 through March 2006)

Report on the Accidental release and Worker Exposure to Anhydrous Ammonia at the BEP I Power Plant, Blythe, Ca. prepared for the California Energy Commission. (October 2004)

Investigation of a Worker Death in a Confined Space, La Paloma Power plant. prepared for the California Energy Commission. (July 2004)

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Mercury Contamination

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Examples

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

DECLARATION OF
SHAHAB KHOSHMASHRAB

I, **SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Facility Design** for the **Palen Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 29, 2010 Signed: [signature]

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting– California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998--Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF
Testimony of Scott Debauche

I, **Scott Debauche,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Socioeconomic Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Socioeconomics** for the **Palen Solar Power Project Revised Staff Assessment** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 18, 2010 Signed: _____

At: Agoura Hills, California

SCOTT DEBAUCHE

Environmental Planner

ACADEMIC BACKGROUND

B.S., Urban & Regional Planning, University of Minnesota, 1994

PROFESSIONAL EXPERIENCE

Mr. Debauche is an environmental planner with 14 years of experience preparing a variety of federal and State of California environmental, planning, and analytical documents for large-scale infrastructure and development projects. Mr. Debauche brings the experience of specializing in the integration and completion of NEPA and CEQA documentation joint documentation. Mr. Debauche specializes in evaluating Transportation/Traffic, Noise, Socioeconomics and Environmental Justice, Air Quality, Alternatives analysis, and public and community involvement programs.

Aspen Environmental Group — 2001 to present

- **TANC Transmission Project (TTP) EIR/EIS, several Northern California Counties.** Mr. Debauche is currently serving as the Technical Specialist in charge of preparation of the EIR/EIS Transportation/Traffic and Socioeconomics CEQA/NEPA analysis. The Transmission Agency of Northern California (TANC) and Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), are the CEQA lead agency and NEPA lead agency, respectively. The TTP generally would consist of new and upgraded 500 kilovolt (kV) and 230 kV transmission lines, substations, and related facilities generally extending from northeastern California near Ravendale in Lassen County to the California Central Valley through Sacramento and Contra Costa Counties and westward into the San Francisco Bay Area.
- **Alta Wind Project EIR, Kern County, CA.** Mr. Debauche is the Technical Specialist for Transportation/Traffic, Noise, and Air Quality for this EIR. The applicant, Alta Windpower Development, LLC, proposes to develop the Alta-Oak Creek Mojave Project (proposed project or project) for the commercial production of up to 800 Megawatts (MW) of electricity from wind turbines. The proposed project would result in construction of up to 350 wind turbine generators, their ancillary facilities and supporting infrastructure located on three distinct land areas comprising a total of approximately 10,750 acres located approximately 3 miles west of State Route (SR) 14 (Antelope Valley Freeway) and 3 miles south of SR-58 in the Willow Springs area of eastern Kern County.
- **Littlerock Reservoir Sediment Removal Project EIS/EIR, Palmdale, CA.** Mr. Debauche is the Technical Specialist for Transportation/Traffic, Noise, and Socioeconomics for this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on USFS Angeles National Forest (NEPA Lead Agency) lands in Los Angeles County. The project involves impacts to the arroyo toad, extensive coordination with USFWS for a Section 7 consultation, incorporation of new Forest Service Plan updates and requirements into the analysis, preparation of the Forest Service required BE/BA, and analysis of compliance with federal conformity requirements. Aspen is currently working on the Administrative Draft EIR/EIS and assisting the PWD with portions of their Proposition 50 grant application to the DWR.

- **Baldwin Hills Oil Field Community Standards District EIR Review and Ordinance Preparation, Culver City, CA.** Mr. Debauche served as the Technical Specialist for the City of Culver City reviewing the Los Angeles County Baldwin Hills Oils Field Community Standards District EIR Noise analysis evaluating the impacts of expanding the existing Baldwin Hills oil field. Once completed, Mr. Debauche then prepared the Noise section of the newly enacted City of Culver City Community Standards District overlay zone restricting noise generation by the Baldwin Hills Oil Field on the residents of Culver City.
- **Long Beach LNG Import Project, Long Beach, CA.** Under contract to the City of Long Beach, Aspen was tasked to review the Draft EIS/EIR for the proposed construction and operation of this onshore Liquified Natural Gas facility to be located at the Port of Long Beach. Mr. Debauche reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Transportation/Traffic and Noise.
- **Sunset Substation and Transmission and Distribution Project CEQA Documentation, Banning, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for this EIR. The City of Banning proposes to construct the Sunset Substation and supporting 33-kilovolt (kV) transmission line that would interconnect with the City's existing distribution system. The purpose of this new substation and transmission is to relieve the existing overloads that are occurring within the City's electric system and to accommodate projected growth in the City.

California Public Utilities Commission (CPUC). Under Aspen's environmental services contract with the CPUC, Mr. Debauche has prepared environmental analysis sections of environmental reports analyzing large-scale infrastructure projects. His project experience with the CPUC includes the following:

- **Tehachapi Renewable Transmission Project (TRTP) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Debauche is currently serving as the Technical Specialist for Noise and Alternatives evaluation for SCE's proposal to construct, use, and maintain a series of new and upgraded high-voltage electric transmission lines and substations to deliver electricity generated from new wind energy projects in eastern Kern County. Approximately 46 miles of the project would be located in a 200- to 400-foot right-of-way on National Forest System land (managed by the Angeles National Forest) and approximately three miles would require expanded right-of-way within the Angeles National Forest. The proposed transmission system upgrades of TRTP are separated into eight distinct segments: Segments 4 through 11. Segments 1 (Antelope-Pardee) and Segments 2 and 3 (Antelope Transmission Project) were evaluated in separate CEQA and NEPA documents as described below.
- **Devers–Palo Verde 500 kV Transmission Line Project EIS/EIR, southern California/western Arizona.** For this EIR/EIS prepared by U.S. Bureau of Land Management and CPUC, Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for SCE's proposed 250-mile transmission line project from the Palo Verde Nuclear power plant in Arizona to the northern Palm Springs area in California. Major issues of concern include EMF and visual impacts on property values, impacts on the area's vast recreational resources and tribal lands, and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC.
- **Antelope-Pardee 500 kV Transmission Line Project EIS/EIR, Los Angeles County, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for SCE's proposed 25-mile transmission line project from the Antelope Substation in the City of Lancaster, through the ANF, and terminating at SCE's Pardee Substation in Santa Clarita. Major issues of concern included impacts to biological, recreational, and cultural resources within Forest lands, EMF and visual impacts on property values, impacts on residences in the urbanized southern regions of the route, and the development and evaluation of several route alternatives.
- **MARS EIR/EIS, Monterey, CA.** Mr. Debauche served as the technical specialist in charge of preparing the Environmental Justice analysis for this EIR/EIS, which would evaluate the effects associated with the

installation and operation of the proposed Monterey Accelerated Research System (MARS) Cabled Observatory Project (Project) proposed by Monterey Bay Aquarium Research Institute (MBARI)[NEPA Lead Agency]. The goal of the Project was to install and operate, in State and Federal waters, an advanced cabled observatory in Monterey Bay that would provide a continuous monitoring presence in the Monterey Bay National Marine Sanctuary (MBNMS) as well as serve as the test bed for a state-of-the-art regional ocean observatory, currently one component of the National Science Foundation (NSF) Ocean Observatories Initiative (OOI). The Project would provide real-time communication and continuous power to suites of scientific instruments enabling monitoring of biologically sensitive benthic sites and allowing scientific experiments to be performed. The environmental justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers. The CEQA Lead Agency was CSLC.

- **El Casco System Project EIR, Riverside, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for this EIR prepared for the CPUC to evaluate SCE's application for a Permit to Construct (PTC) the El Casco System Project. The Proposed Project would be located in a rapidly growing area of northern Riverside County, which includes the Cities of Beaumont, Banning, and Calimesa. A 115 kV subtransmission line begins at Banning Substation and extends westward toward the proposed El Casco Substation site within the existing Banning to Maraschino 115 kV subtransmission line and Maraschino–El Casco 115 kV subtransmission line ROWs. Major issues of concern include impacts to existing and residential land uses, which have led to the development of a partial underground alternative and a route alternative different than the project route proposed by SCE (the Applicant). The 1,200-page Draft EIR was released for a 45-day public review and comment on December 12, 2007, and evaluates project alternatives at the same level of detail as the Proposed Project analysis.
- **Antelope Transmission Project, Segments 2 & 3 EIR, Los Angeles and Kern Counties, CA.** For this EIR being prepared by the CPUC, Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation. The proposed Project includes both Segment 2 and Segment 3 of the Antelope Transmission Project, and involves construction of new transmission line infrastructure from the Tehachapi Wind Resource Area in southern Kern County, California, to SCE's existing Vincent Substation in Los Angeles County, California. The Tehachapi Wind Resource Area is one of the State's greatest potential sources for the generation of wind energy. A variety of wind energy projects are currently in development for this region. Major issues of concern include EMF and visual impacts on property values, impacts on residences and agricultural resources, and the development and evaluation of several substation and route alternatives.
- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project EIR, San Luis Obispo County, CA.** Mr. Debauche served as the Technical Specialist for Socioeconomics and Alternatives evaluation of this EIR. The EIR addressed impacts associated with the replacement of the eight original steam generators (OSGs) at DCPP Units 1 and 2 due to degradation from stress and corrosion cracking, and other maintenance difficulties. The Proposed Project would be located at the DCPP facility, which occupies 760 acres within PG&E's 12,000-acre owner-controlled land on the California coast in central San Luis Obispo County.
- **SDG&E Miguel Mission Substation Draft EIR.** The major part of the Proposed Project would include the installation of a new, bundled 230 kV circuit between Miguel and Mission Substations, which would be located entirely within SDG&E's existing 35-mile ROW. Mr. Debauche prepared social science analysis for the Initial Study, as well as the Draft EIR Project Description and several key environmental sections.
- **PG&E's Proposed Divestiture of Hydroelectric Assets Project EIR.** Mr. Debauche prepared several key sections of the Draft EIR, including Socioeconomics and Hazardous Materials analysis.
- **Viejo System Project IS/MND, Orange County, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the project's CEQA documentation, including and Initial Study, prepared on behalf of the CPUC to evaluate Southern California Edison's (SCE) Application for a Permit to Construct the Viejo System Project, which was in SCE's forecasted demand of electricity and goal of providing reliable electric service in southern Orange County. The Viejo System Project would serve Lake Forest, Mission Viejo, and the surrounding areas. Components of the project included, construction of the new 220/66/12 kilovolt (kV) Viejo Substation, installation of a new 66 kV subtransmission line within an existing SCE right-of-way, replacement of 19

double-circuit tubular steel poles with 13 H-frames structures, and minor modification to other transmission lines. Major issues of concern include visual impacts of transmission towers, EMF effects, and project impacts on property values.

- **Looking Glass Networks Fiber Optic Cable Project IS/MND, northern and southern California.** As part of Aspen's ongoing contract with the CPUC for review of Telecommunications projects, this document encompasses and evaluation of project impacts and network upgrades in the San Francisco Bay Area and the Los Angeles Basin Area. Prepared the socioeconomic analysis for this comprehensive CEQA document reviewing the potential impacts of hundreds of miles of newly proposed fiber optic lines throughout northern and southern California, including Los Angeles and Orange Counties.

California Energy Commission (CEC), Technical Assistance in Application for Certification Review. In response to California's power shortage, Aspen is assisting the California Energy Commission in evaluating the environmental and engineering aspects of new power plant applications throughout the State. As part of this effort, Mr. Debauche works as a technical specialist for Transportation/Traffic, Socioeconomics and Environmental Justice, and Alternatives analyses for the following power plant projects:

- **Carlsbad Energy Center Project, Carlsbad, CA.** Technical Specialist for both the Transportation/Traffic and Alternatives Staff Assessment for Carlsbad Energy Center, LLC's Application for Certification (AFC) to build the Carlsbad Energy Center Project (CECP), which will consist of a 558 MW gross combined-cycle generating facility configured using two units with one natural-gas-fired combustion turbine and one steam turbine per or unit. Issues of concern include major incompatibilities with local LORS, and cumulative impacts from widening of I-5.
- **GWF Tracy Combined Cycle Power Plant, San Joaquin County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for GWF's proposal to modify the existing TPP, a nominal 169-megawatt (MW) simple-cycle power plant, by converting the facility into a combined-cycle power plant with a nominal 145 MW, net, of additional generating capacity.
- **GWF Henrietta Peaker Project, Kings County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for GWF's proposal to modify the existing Henrietta Power Plant. New once-through steam generators (OTSGs) will be installed to allow the plant to be operated in its current simple-cycle configuration with no steam generation but with the selective catalytic reduction (SCR) and oxidation catalyst in operation, or to operate as a combined-cycle power plant generating an additional 25 MW of power with new proposed emission limits.
- **CPV Vaca Station Power Plant, Solano County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for CPV Vacaville, LLC (CPVV) filed an Application for Certification (08-AFC-11) seeking authority to construct and operate the CPV Vaca Station (CPVV) project, a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 660 megawatts (MW). The CPVV is proposed for a 24-acre site located at the intersection of Lewis and Fry roads in a rural area within the city limits of Vacaville, Solano County.
- **Kings River Conservation District Community Peaker Power Plant, Fresno County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for the Kings Rivers Conservation District, who filed a Small Power Plant Exemption for the King River Conservation District Peaking Power Plant. The proposed 97-megawatt natural gas-fired plant will be located south of the City of Fresno and near the community of Malaga in Fresno County.
- **Lodi Energy Center, Lodi, CA.** Technical Specialist for the Socioeconomics Staff Assessment for a combined-cycle nominal 225-megawatt (MW) power generating facility.
- **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Technical Specialist for the Socioeconomics Staff Assessment/BLM EIS for a 400-megawatt solar thermal electric power generating system. The project's technology would include heliostat mirror fields focusing solar energy on power tower receivers producing steam for running turbine generators. Related facilities would include administrative buildings, transmission lines, a substation, gas lines, water lines, steam lines, and well water pumps. The proposed project would be developed entirely in the Mojave Desert region of San Bernardino County, California.

- **Canyon Power Plant, Anaheim, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a nominal 200 megawatt (MW) simple-cycle plant, using four natural gas-fired combustion turbines and associated infrastructure proposed by Southern California Public Power Authority (SCPPA). This project is a peaking power plant project located within the City of Anaheim, California.
- **Valero Cogeneration Project, Benicia, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a proposed cogeneration facility at the Valero Refinery in Benicia. Issues addressed included impacts on public services and other project-related population impacts such as school impact fees.
- **Rio Linda/Elverta Power Project, Sacramento, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a 560-megawatt natural gas power plant in the northern Sacramento County. Issues of importance included environmental justice and impacts on property values.
- **Magnolia Power Project, Burbank, CA.** Technical Specialist for the Socioeconomics Staff Assessments for this nominal 250-megawatt natural gas combined-cycle fired electrical generating facility to be located at the site of the existing City of Burbank power plant. Environmental justice issues and potential impacts on local economy and employment were evaluated.
- **Avenal Energy Project, Kings County, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a 600-megawatt combined cycle electrical generating facility, and associated linear facilities.
- **Inland Empire Energy Center, Riverside County, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a 670-megawatt natural gas-fired, combined-cycle electric generating facility and associated linear facilities including, a new 18-inch, 4.7-mile pipeline for the disposal of non-reclaimable wastewater, and a new 20-inch natural gas pipeline. The project would be located on approximately 46-acres near Romoland, within Riverside County.
- **Coastal Plant Study.** Technical Specialist for the Socioeconomics Staff Assessments for a possible modernization, re-tooling, or expansion of California's 25 coastal power plants including the Encina Power Plant and the San Onofre Nuclear Power Plant.

Los Angeles Department of Water and Power (LADWP). Responsible for conducting the analyses of the technical and social science issue areas for a variety of EISs and EAs as part of two environmental services contracts. Delivery orders have included:

- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the CEQA document for this project. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the Upper and Lower Reaches of the existing RSC pipeline, which would involve the construction of approximately 69,600 linear feet (about 13.2 miles) of 42-, 48-, 60-, 66-, 72-, 84-, and 96-inch diameter welded steel underground pipeline.
- **Mulholland Pumping Station and Lower Hollywood Reservoir Outlet Chlorination Station Project IS/MND, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to replace the existing historic pumping/chlorination station building as well as the existing lavatory and unoccupied Water Quality Laboratory buildings with a new single structure pumping/chlorination station within the LADWP's Hollywood Reservoir Complex located in the Hollywood Hills section of the City Los Angeles. These improvements were required due to the age and deterioration of the facility and the potential risk of seismic damage to existing structures. An Initial Study was prepared in support of a City of Los Angeles General Exemption.
- **Taylor Yard Water Recycling Project (TYWRP) IS/MND, Los Angeles and Glendale, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to construct the TYWRP in order to provide recycled water produced by the Los Angeles–Glendale Water Reclamation Plant (LAGWRP) to the Taylor Yard. An important part of the City of Los Angeles' expanding emphasis on water conservation is the concept that water is a resource that can be used more

than once. Because all uses of water do not require the same quality of supply, the City has been developing programs to use recycled water for suitable landscaping and industrial uses. The project is located in the southernmost part of the City of Glendale and northeastern part of the City of Los Angeles. The IS/MND was adopted in the Summer of 2007.

- **DC Electrode Project IS/MND, Los Angeles, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to construct a new electrode distribution line from West Los Angeles to the Pacific Ocean stopping point in Malibu, CA up the Pacific Coast Highway.
- **District Cooling Plant Project, Los Angeles IS/MND, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to construct a District Cooling Plant and Distribution System (proposed project) in order to provide a centralized system for producing chilled water for use by area users, which are generally large commercial, governmental, industrial and institutional buildings who generate their own chilled water utilizing individual chiller plants for space cooling and air-conditioning.

U.S. Army Corps of Engineers, Los Angeles District. Responsible for conducting the analyses of the social science issue areas for a variety of EISs and EAs as part of two environmental services contracts. Delivery orders have included:

- **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** Worked with preparation of an alternatives analysis report that evaluated the potential environmental impacts associated with channel and detention basin alternatives to control flooding problems resulting from fast rate of development in the northeast Phoenix area.
- **Murrieta Creek Flood Control and Environmental Restoration Project**. Mr. Debauche served as a technical writer of an Environmental Assessment and Mitigation Monitoring plan for Phase 1 of a flood control and restoration project in Riverside County.

California Department of Water Resources. Responsible for conducting the environmental analyses for CEQA compliance as part of two environmental services contracts. Delivery orders have included:

- **Piru Creek Stabilization and Restoration Project.** The California Department of Water Resources (CDWR) proposes to repair erosion damage at a series of three locations downstream of Pyramid Dam and seismically retrofit the Pyramid Dam access bridge that crosses Piru Creek. Mr Debauche served as technical writer of the Initial Study for this project.

Los Angeles Unified School District (LAUSD), Los Angeles County, CA. Deputy Program manager and Technical writer for several CEQA documents (EIRs and IS/MNDs) being prepared as part of Aspen's ongoing services contract with the LAUSD to help approve school projects that would meet existing overcrowded conditions in the greater Los Angeles area. Projects have included:

- **New School Construction Program EIR.** Serves as a technical writer for social science issues, including socioeconomics, and population and housing for this Program EIR being prepared for the LAUSD. The LAUSD 2020 Program would provide student seats throughout the LAUSD via a combination of the addition of portable classrooms to existing campuses, modernization and reconfiguration of existing campuses, and the construction of new schools. Mr. Debauche prepared the Noise, Socioeconomic, and Alternative Evaluation of this EIR.
- **East Valley Middle School No. 2 EIR.** Served as a key technical writer for this middle school project proposed to be located at the previous Van Nuys Drive-In site. The EIR focused on impacts associated with air quality, hazards and hazardous materials, noise, land use and planning, and traffic and transportation. Major issues of concern included traffic and noise generated by school operation activities. The EIR included LAUSD design standards and measures employed to minimize environmental impacts.
- **Mt. Washington Elementary School Multi-Purpose Room Addition Project IS/MND.** Served as Deputy Program Manager for this project proposed the development of a multi-purpose room facility, including a library, auditorium, and theater, to the existing Mt. Washington Elementary School campus located in Los Angeles. The surrounding residential community had concerns regarding the proposed

project's impacts on aesthetics, traffic, air quality, and noise. Of particular concern, was impacts generated due to the after-hours use of the multi-purpose room facility by civic and community groups.

- **Canoga Park New Elementary School IS/MND.** Served as technical writer for this elementary school project proposed to be developed on a parcel of land owned by the non-profit organization, New Economics For Women (NEW). This "turn-key" project consisted of a Charter Elementary School to be developed by NEW and sold to the LAUSD for operation. It was later decided that NEW would lease the school back and run it as a charter school. Issues of concern included, pedestrian safety, traffic, air quality, noise, and land use.
- **Hughes Magnet Span School IS/MND.** Served as a technical writer for socioeconomics, hydrology, public services and utilities, and recreational impacts for the proposed re-opening of the existing Hughes Middle School as a Magnet Span School serving up to 1,620 District 6th though 12th grade students. The re-opening of the Hughes Middle School would require the relocation of the existing uses of the campus. The existing Enadia Way Elementary School and Platt Ranch Elementary School would be re-opened for the relocation of these uses.
- **Wonderland Elementary School Portable Classroom Additions IS/MND.** Served as the technical writer of an IS/MND for a proposed addition to the Wonderland Avenue Elementary School, located in the City of Los Angeles. Ms. Walker is responsible for overall coordination and scheduling of the project's environmental review, communications with the LAUSD, senior technical review of all documents produced, presentation during the project's public scoping meetings and hearings, and assurance of public noticing. Served as technical writer of the IS/MND.
- **Pio Pico Elementary School Playground Expansion IS/MND**. Completed a Notice of Preparation, Initial Study, and Administrative Draft EIR for the expansion of a playground at the existing Pio Pico School in the LAUSD. The playground was proposed on five residential properties. One of the residences is a potentially significant historical resource because of its association with an African-American woman journalist, Fay M. Jackson. This project was cancelled by the LAUSD after completion of the administrative draft report. Served as technical writer of the IS/MND.
- **Fairfax Senior High School Portable Classroom Addition IS/MND**. Served as technical writer of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.
- **Polytechnic Senior High School Portable Classroom Addition IS/MND**. Served as technical writer of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.
- **Washington Senior High School Portable Classroom Addition IS/MND**. Served as technical writer of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.

EIP Associates 1998 to 2001

MTA Mid Cities/Westside Transit Corridor Study EIS/EIR. Was a key writer of the EIS/EIR for this 3-phase (including prepared the Major Investment Study (MIS), the Environmental Impact Statement (EIS), and an evaluation of the urban design implications of transit interventions on selected routes) study intended to address current and long range traffic congestion in the central and westside areas of the Los Angeles Basin. Three east/west corridors and a range of transit alternatives ranging including Rapid Bus, light rail, and heavy rail are being evaluated. In addition to preparing several issue area chapters of this comprehensive joint EIS/EIR, Mr. Debauche assisted with the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the land use and socioeconomics sections of the EIS/EIR.

Wes Thompson Ranch Development Project EIR. Served as project writer for this hillside residential development in the City of Santa Clarita. Issues of concern included seismic and air quality impacts associated with the excavation of 2 million cubic yards of soil, the project's non-compliance with the City's hillside ordinance for innovative design, and traffic generated by project-related population growth in the area. Four different site configuration alternatives were developed as part of the EIR analysis. Other

issues of concern included sensitive biological resources, the potential for hydrological impacts due to disturbance of the hillside, and cultural resources. As the technical writer for socioeconomics, noise, hazardous materials, air quality, and public services, Mr. Debauche conducted analysis and prepared these environmental sections as well as the project description, alternatives screening and development, traffic assistance, and cumulative scenario for:

City of Santa Monica Environmental Assessments. Was key writer of several environmental assessment documents for housing, commercial, institutional, and mixed-use developments in compliance with CEQA. As the technical writer for socioeconomics, noise, hazardous materials, air quality, and public services, Mr. Debauche conducted analysis and prepared these environmental sections as well as the project description, alternatives screening and development, traffic assistance, and cumulative scenario for:

- **Seaview Court Condominiums IS/MND.** This comprehensive Initial Study/Mitigated Negative Declaration included six technical reports including traffic, cultural resources, parking survey, shade and shadow analysis, and a geotechnical assessment to evaluate the level of severity of this development in the waterfront area of Santa Monica. Major issues of concern were; parking and project-generated traffic on adjacent narrow residential streets; visual obstruction and shading impacts of the proposed structure; liquefaction and seismic impacts to adjacent properties as result of the projsect's excavation for a subterranean parking garage; and the potential impacts of the project to impact the integrity of a historic district and the historic Seaview Walkway to the beachfront.
- **Four-Story Hotel IS/MND.** A comprehensive Initial Study/Mitigated Negative Declaration was prepared for this four-story hotel adjacent to St. John's Hospital in Santa Monica. Major issues of concern included project-generated traffic on surrounding multi-family residential uses and emergency access to the hospital.
- **Santa Monica College Parking Structure B Replacement EIR.** This focused EIR addressed issues related to traffic and neighborhood land use impacts associated with the addition of a 3-story parking structure in the center of the SMC campus. Major issues of concern included the potential for project-generated traffic to cause congestion at the school's main entrance on Pico Boulevard, and the potential for overflow traffic to impact the Sunset Community of single-family homes adjacent to the school.
- **North Main St. Mixed-Use Development Project EIR**. This EIR included evaluation of impacts resulting from the development of a mixed-use development in Santa Monica's "Commercial Corridor" on Main Street, with ground-floor residences and boutique commercial uses. Major issues of concern included traffic and parking impacts to Main Street and surrounding residential land uses, shade and shadow impacts, and neighborhood impacts.

Specific Plans and Redevelopment Projects. As the technical writer for socioeconomics, noise, hazardous materials, air quality, and public services, Mr. Debauche conducted analysis and prepared these environmental sections as well as the project description, alternatives screening and development, traffic assistance, and cumulative scenario for:

- **Cabrillo Plaza Specific Plan EIR in Santa Barbara.** This project consisted a mixed-use commercial development on Santa Barbara's waterfront on Cabrillo Boulevard. On-site uses included an aquarium, specialty retail, restaurants, and office space.
- **Culver City Redevelopment Plan and Merger EIR.** This programmatic EIR evaluated the impacts of the City's redevelopment of its redevelopment zones. A major land use survey and calculation of acreage of redevelopment lands was conducted as part of the EIR.
- **Dana Point Headlands Specific Plan EIR.** This EIR evaluated the development of coastal bluff in the City with hotel, single- and multi-family residential, and commercial uses. Major issues of concern included ground disturbance as a result of excavation, impacts to terrestrial and wildlife biology, recreation impacts to beachgoers, and project-generate population inducement.
- **Triangle Gateway Redevelopment Project EIR in Beverly Hills, CA.** This EIR evaluated the development of a supermarket, retail shops, and office space in the triangle gateway portion of

downtown Beverly Hills. Issues of concern evaluated by Mr. Debauche included traffic, land use, and impacts to on-site historic structures.

- **UCLA Campus Housing Expansion.** This EIR evaluated the development and expansion of campus housing within the UCLA campus. Issues of concern evaluated by Mr. Debauche included hazardous materials and population/housing.

CH2M Hill - Minneapolis, MN 1995 to 1998

- **Minneapolis/St. Paul International Airport Expansion EIS:** Mr. Debauche was a key writer of the EIS for this $4 million technical and environmental study, including the preparation of an Environmental Impact Statement (EIS), and an evaluation of the urban design implications of a proposed $800 million expansion of the existing MSP International airport, including transit and terminal modifications and the inclusion of a new perpendicular runaway. The studies included alternatives to the project and the long-term effects on the cities of Minneapolis and St. Paul. In addition to preparing several issue area chapters of this comprehensive EIS, Mr. Debauche assisted with the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the socioeconomics sections of the EIS. In addition, Mr. Debauche assisted with preparation of a technical report on airport noise effects on nearby housing and mitigation programs for the impacts of the proposed runway.
- **Minneapolis/St. Paul Wastewater Treatment Facility Expansion EIS:** Was a key writer of the EIS for expansion of the existing wastewater treatment facility serving the twin cities area. The studies included alternatives to the project and the long-term effects on the cities of Minneapolis and St. Paul. Mr. Debauche prepared several issue area chapters of this comprehensive EIS, including the Environmental Justice Analysis (per Executive Order 12898), and the socioeconomics sections of the EIS.

PROFESSIONAL ASSOCIATIONS

- American Planning Association (APA), Chapter Member

DECLARATION OF
Andrea Koch

I, **Andrea Koch**, declare as follows:

1. I am presently employed by the **California Energy Commission** in the **Siting, Transmission, and Environmental Protection Division** as an **Environmental Planner I**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Traffic and Transportation** for the **Palen Solar Power Project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/6/10 Signed: Andrea Koch

At: Sacramento, CA

ANDREA KOCH

PROFESSIONAL EXPERIENCE

CALIFORNIA ENERGY COMMISSION, December 2009 – Present
Siting, Transmission, and Environmental Protection Division, Sacramento, California
Environmental Planner I- Perform environmental review of power plant applications.

- Review power plant applications for transportation, land use, visual, and socioeconomic impacts.
- Write environmental analysis documents.

CITY OF SACRAMENTO, June 2007 – July 2009
Planning Department, Long-Range Planning Division, Sacramento, California
Assistant Planner- Performed long-range city planning for Sacramento.

- Coordinated review of the Draft 2030 General Plan, a comprehensive citywide land use plan.
- Prepared Ben Ali and Hagginwood neighborhood plans. Worked with City staff and community members to identify strategies for resolving neighborhood issues, such as infrastructure deficiencies.
- Reviewed 70 development applications, analyzing their consistency with City policy and providing written feedback to applicants.

COUNTY OF SANTA CRUZ, June 2005 – June 2007
Planning Department, Environmental Planning Division, Santa Cruz, California
Resource Planner II- Performed resource planning for Santa Cruz County.

- Reviewed development permit applications to ensure their consistency with regulations for creeks, wetlands, grading, geologic hazards, erosion control, and sensitive plant and animal species.
- Wrote staff reports analyzing development proposals and providing recommendations to the Environmental Planning Division Manager.
- Performed an average of 5 weekly pre-construction meetings and final inspections at project sites to ensure that development was consistent with County regulations and required mitigations.
- Regularly assisted the public with resource planning questions, both in-person and over the phone.

COUNTY OF MONTEREY, November 2004 – June 2005
Planning Department, Marina, California
Assistant Planner- Performed current planning for Monterey County.

- Reviewed development permit applications for consistency with County regulations.
- Prepared and presented staff reports for development applications. Reports provided recommendations to the Zoning Administrator.
- Assisted the public with zoning questions, both in-person and over the phone.

EDUCATION

California Polytechnic State University, San Luis Obispo, California

- Master of City and Regional Planning, Concentration in Environmental Planning, 2004

University of California, Davis

- Bachelor of Science in Wildlife, Fish, & Conservation Biology, Concentration in Conservation Biology, 2002
- Graduated with High Honors and a Department Citation

DECLARATION OF
JAMES EARL JEWELL

I, James Earl Jewell, declare as follows:

1. I am currently under contract with the Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-08-001 I am serving as an Illuminating Engineer to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.

2. A copy of my professional qualifications and experience is attached hereto and incorporated herein.

3. I assisted in the preparation of the staff testimony on Traffic and Transportation for the Palen Solar Energy Project (09-AFC-7) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable sources and documents, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is accurate and valid with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions applicable to matters of intrusive light and glare and relative brightnesses, and if called as a witness, could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10 August 2010 Signed: _____

At: San Francisco, California

JAMES EARL JEWELL, LC, ATF, IES, CIES (Hon), SAH

EDUCATION:

BA, College of the Pacific
MFA, School of Drama, Yale University

EMPLOYMENT:

1957-67, Engineering Division, Holzmueller Corporation
1967-69, Theatre Consulting Service, Bolt, Beranek & Newman
1969-87, Lighting Services Administrator, Pacific Gas & Electric Company
1987- present, Consultant in Lighting
Since 1993 in association with Alan Lindsley, AIA, IES

PROFESSIONAL ACTIVITIES:

Illuminating Engineering Society
President – 1984-85
Vice President – 1983-84
Director – 1979-86
Office Lighting Committee – 1976 - present, Chairman, 1978-80
Roadway Lighting Committee – 1974 – present, Chairman, 1990-92
Regional Energy Committee Chairman – 1974-76, 1978-84
Energy Advisory Committee – 1973-75
Technical Missions – China – 1984, 1987, 1988

European Lighting Congress: Strasbourg, 1969; Florence, 1977; Granada, 1981; Lausanne, 1985; Budapest, 1989; Edinburgh, 1993; Berlin, 2001

Pacific Basin Lighting Congress: Chairman, Shanghai, 1989; Bangkok, 1993; Nagoya, 1997; Organizing Committee, Delhi, 2002; Cairns, 2005; Bangkok, 2009

Edison Electric Institute: Street Lighting Committee – 1971-87, Chairman 1979-81

International Commission on Illumination:
Board of Administration – 1983-87, 1987-91
Division Four (Lighting for Transport)
Technical Committee 4.34 -- 1980-95
Technical Committee 4.25 -- 1992-99

Professional Light Designers Convention: London, 2007; Berlin, 2009

Expert Witness – Admitted as an expert witness in the Superior Courts of Amador, Contra Costa, and San Francisco Counties.

AWARDS AND HONOURS:

IES Regional Technical Award – 1985
IES Distinguished Service Award – 1986
College of Fellows of the American Theatre --1988
Honourary Member, China IES – 1989
CIE Distinguished Service Award – 1991
IES Louis B. Marks Award – 1993

CERTIFICATION:

LC – Granted in 1990 by the National Council on the Qualification of Lighting Professionals

RELEVENT WORK EXPEREIENCE:

With PG&E appeared before CEC Committee and Staff on lighting issues with respect to the siting and licensing of Geysers steam power plants.

On behalf of PG&E and the IES appeared before the Simonson Committee to consult on the development of the lighting portions of Title 24.

On behalf of PG&E and the IES appeared before the CEC on numerous occasions to support the development of fluorescent lamp promotional programs and to assist in developing rigorous lighting ballast standards for California and on other lighting energy management issues.

While at PG&E supported and oversaw funding for projects on daylight following and electronic ballasts. Projects supported by both the DOE and CEC.

In practice as a lighting consultant worked with private clients and jurisdictions on matters concerned with light trespass and "intrusive" lighting.

JEJewell
19 February, 2010

DECLARATION OF

Dr. Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Staff Toxicologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony and errata on **Transmission Line Safety and Nuisance** for the **Palen Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 7/29 2010 Signed: O Odoemelam

At: Sacramento, California

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF
Suzanne L. Phinney, D.Env.

I, Suzanne L. Phinney, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare staff testimony on **Waste Management**, **TSE Appendix A** and **Response to Comments** for the **Palen Solar Power Project Revised Staff Assessment** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 7/30/2010 Signed: Suzanne L Phinney

At: Sacramento, California

SUZANNE L. PHINNEY

Senior Associate, Energy and Infrastructure

ACADEMIC BACKGROUND

Doctorate, Environmental Science & Engineering (D.Env.), University of California, Los Angeles, 1981
M.S., Marine Biology, Dalhousie University, Halifax, Nova Scotia, Canada, 1975
B.A., Biological Sciences, University of California, Berkeley, 1973

PROFESSIONAL EXPERIENCE

Dr. Phinney has 30 years of experience in the environmental and energy field, providing technical and policy support in energy analysis, environmental assessment, environmental remediation, air and water quality assessments, risk assessment, regulatory compliance, permitting, and project/program management. Her particular emphasis is energy and infrastructure with projects addressing climate change, alternative energy generation technologies, liquefied natural gas, petroleum infrastructure, advanced transportation vehicles and fuels, land use and energy, and power plant siting. Prior to employment at Aspen, Dr. Phinney worked for 16 years with Aerojet, where she oversaw all environmental and safety issues.

Aspen Environmental Group — 2001 to present

Dr. Phinney manages energy and infrastructure projects for Aspen and provides environmental support on major projects. She has provided energy and environmental expertise to the following clients:

California Energy Commission (CEC). Dr. Phinney has supported CEC staff since 2001. She has prepared analyses for several power plants throughout the State, and has authored or contributed to over a dozen special studies. She is currently Deputy Program Manager for planning studies conducted by the Aspen team. Her major efforts for the CEC include the following.

- **Power Plant Siting, CEC, Project Management/Technical Support (2001 – Present).** Dr. Phinney prepared the alternatives analysis for the following power plants under review by the Energy Commission:
  - **Palomar Energy Project –** 500 MW combined-cycle natural gas facility in Escondido, San Diego County
  - **Russell City Energy Center –** 600 MW combined-cycle natural gas facility in Hayward, Alameda County
  - **Eastshore Energy Center -** 115.5 MW simple-cycle natural gas facility in Hayward, Alameda County
  - **Carrizo Energy Solar Farm –** 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
  - **CPV Sentinel Energy Project –** 850 MW natural gas plant in the Coachella Valley, Riverside County
  - **Marsh Landing Generating Station-** 930 MW natural gas plant within the existing Contra Costa Power Plant in Antioch, Contra Costa County
  - **Orange Grove Project –** 96 MW natural-gas peaking facility near Pala, San Diego County
  - **Willow Pass Generating Station –** 550 MW natural gas plant within the existing Pittsburg Power Plant in Pittsburg, Contra Costa County

- **Almond 2 Peaking Power Plant Project** – 174 MW natural-gas peaking facility near Ceres, Stanislaus County
- **Abengoa Mojave Solar Project** – 250 MW solar thermal (parabolic trough) plant near Harper Dry Lake, San Bernardino County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County

Dr. Phinney prepared the waste management assessments of power plant licensing applications:

- **Eastshore Energy Center –** 115.5 MW natural gas simple-cycle plant in Hayward, Alameda County
- **Carrizo Energy Solar Farm –** 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
- **Palmdale Hybrid Power Project –** 570 MW natural gas-solar thermal (parabolic trough) hybrid plant in Palmdale, Los Angeles County
- **SES Solar Two Siting Case –** 750 MW solar thermal (Stirling dish) plant on 6,500 acres of mostly BLM land in Imperial County
- **Hanford Energy Park Peaker Plant –** 120 MW simple-cycle, natural gas facility in Hanford, Kings County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County
- **Blythe Solar Power Project** – 1,000 MW solar thermal (parabolic trough) plant on 9,400 acres of BLM land near Blythe, Riverside County
- **Palen Solar Power Project** – 500 MW solar thermal (parabolic trough) plant on 5,200 acres of BLM land in the Chuckwalla Valley, Riverside County

Dr. Phinney also coordinated the study of cooling water alternatives for the Tesla and Tracy natural gas, combined-cycle power plants.

- **Environmental Performance Report, CEC, Project Manager/Technical Support (2001, 2003, 2005)**.Dr. Phinney was Project Manager for Aspen's technical contributions, graphics and production efforts for the 2001 Environmental Performance Report (EPR) which detailed the current and historical air, water and biological impacts from in-state generation facilities. She provided support to the water resources discussion in the 2003 EPR and managed the analysis of out-of-state generation facilities for the 2005 EPR.
- **Advanced Electric Generation Technologies, CEC, Project Manager (2001 - 2002).** Dr. Phinney served as Project Manager for a report defining the technical development, developmental capacity, commercial status, costs and deployment constraints of selected alternative electric generation technologies. Technologies included geothermal, fuel cell, solar thermal, solar photovoltaic, wind and hydro. The focus was on development and application of the technology in California. Two page fact sheets on each technology and a matrix comparing all technologies was developed. Finally, an updated discussion of renewable technologies was developed for insertion into the alternatives section of Staff Assessments for power plant applications.
- **Liquefied Natural Gas Support, CEC, Technical Author (2002 – 2007**). Dr. Phinney has been instrumental in the preparation of numerous safety and policy reports on liquefied natural gas (LNG). She authored the Commission document: *International and National Efforts to Address the Safety and Security of Importing Liquefied Natural Gas: A Compendium*. This report reviewed national and international LNG regulations, standards and guidelines, reviewed risk assessment techniques, and identified, compiled and reviewed LNG safety/risk studies. Dr. Phinney helped organize LNG Access Workshops held in June 2005 and prepared a 40 page summary of presentations made at the workshops. She developed over 30 fact sheets on LNG subject areas for distribution to the public. Dr. Phinney compiled state and local comments on a proposed LNG terminal at the Port of Long Beach;

these were presented in the *Safety Advisory Report on the Proposed Sound Energy Solutions Natural Gas Terminal at the Port of Long Beach, California,* which was delivered to the Federal Energy Regulatory Commission within the mandated 30-day period imposed by the 2005 federal Energy Bill. She provided technical review for the report *The Outlook for Global Trade in Liquefied Natural Projections to the year 2020.*

- **Natural Gas Market Assessment Support, CEC, Technical Author/Editorial Support (2005 –** 2007). Dr. Phinne**y c**ontributed to natural gas supply and demand analyses for the Commission document, *Natural Gas Assessment Update*. She provided technical and editorial support to the 2005 and 2007 Integrated Energy Policy Report (IEPR) documents, *Preliminary (and subsequently the Revised report) Reference Case in Support of the 2005 Natural Gas Market Assessment* and *2007 Natural Gas Market Assessment.* She edited the Commission document *Natural Gas Quality: Power Turbine Performance During Heat Content Surges.*
- **Petroleum Infrastructure Environmental Performance Report, CEC, Project Manager (2005)**. Dr. Phinney served as Project Manager for the 2005 IEPR document *Petroleum Infrastructure Environmental Performance Report.* In addition to managing preparation of the report and workshop presentations, she prepared responses to comments and provided policy recommendations.
- **Hydropower and Global Climate Change, CEC, Technical Author (2005)**. Dr. Phinney coauthored the document *Potential Changes in Hydropower Production from Global Climate Change in California and the Western United States*. This report investigated the effects of climate change on hydropower production in the West and compared impacts and policy actions in California, the Pacific Northwest, and the Southwest.
- **Advanced Energy Pathways, CEC, Project Manager (2006 – 2008).** Dr. Phinney provided project management support for a 3-year study evaluating the effects of advanced transportation technologies and fuels (out to 2050) on California's natural gas and electricity systems. This report involved the development of baseline and alternative energy demand and supply scenarios, in-depth technical analysis of advanced transportation technologies and fuels, and the development of an energy-rich model.
- **Land Use and Energy, CEC, Project Manager/Technical Author (2006 – 2008).** Dr. Phinney authored a CEC report on the linkages between land use and energy, which ultimately became one of the two chapters presented in the 2006 IEPR Update. The report highlighted how energy can be better integrated in land use planning, and how efforts such as smart growth can help the state meet its energy and greenhouse gas emission reduction goals. She organized a full-day workshop involving over a dozen speakers representing state agencies, local governments, research entities, environmental groups, utilities, and non-profits. Dr. Phinney was one of the authors of the 2007 land use and energy follow-up report which further defined the role of land use in meeting California's energy and climate change goals. She helped synthesize the report into a chapter for the 2007 IEPR. Dr. Phinney helped edit the Land Use Subgroup of the Climate Action Team report prepared for submission to the California Air Resources Board AB 32 Scoping Plan.
- **AB 1632 Nuclear Power Plant Assessment, CEC, Technical Author (2007 – 2008).** Dr. Phinney was a key member of a team evaluating nuclear power issues in the state in response to AB 1632 legislation. She managed and prepared report sections regarding the impacts to local communities and the environmental issues and costs associated with alternatives, including renewables, to the state's two nuclear facilities. These sections were incorporated in the report *An Assessment of California's Nuclear Power Plants.*
- **Environmental Screening Tool for Out-of-State Renewable Energy Facilities, CEC, Project Manager (2009).** Dr. Phinney prepared an environmental screening tool/analysis allowing CEC to determine quickly whether out-of-state renewable facilities requesting RPS certification met California laws, ordinances, regulations and standards.

- **Energy Aware Facility Planning and Siting Guide, CEC, Project Manager (2009-2010).** Dr. Phinney is updating a 1997 version of the Energy Aware Guide to help local governments plan for and permit electricity generation facilities and transmission lines that will be needed in the upcoming years. The Guide informs planners, decision makers and the public about what, how, and why electricity infrastructure may be developed.

California Public Utilities Commission. Dr. Phinney has managed several environmental assessments for the CPUC and has been heavily involved in editorial support of many other CPUC documents prepared by Aspen.

- **Looking Glass Network Initial Study/Mitigated Negative Declaration, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the preparation of Initial Study/Mitigated Negative Declarations (IS/MND) for this telecommunication project that involved construction in the San Francisco Bay Area and the Los Angeles Basin to allow fiber optic connections in numerous locations.
- **Williams Communications Sentry Marysville Project IS/MND, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the installation of fiber optic connection to a Beale Air Force Base in Yuba County.
- **Kirby Hills II Natural Gas Storage Facility IS/MND, CPUC, Project Manager (2007).** Dr. Phinney managed an IS/MND for expansions at a natural gas storage facility in Solano County.
- **Multiple EIR Documents, CPUC, Technical Editor (2004 - 2008).** Dr. Phinney provided editorial and QA/QC review for the Diablo Canyon Steam Generator Replacement EIR, the Miguel Mission 230 kV Transmission Line EIR and the Sunrise Powerlink EIR/EIS.

California Institute of Technology/University of California. Dr. Phinney provided project management support to the following project.

- **Combined Array for Research in Millimeter-wave Astronomy EIS/EIR**, **U.S. Forest Service and the University of California (2001 – 2002).** Dr. Phinney was the Project Manager for this EIS/EIR for a radio telescope antenna array to be placed at a high altitude site in the Inyo National Forest. The evaluation of alternatives was especially contentious, and Aspen's field analyses of several potential sites were pivotal in the ultimate selection of one of these alternative sites.

Western Area Power Administration. Dr. Phinney provided editorial and QA/QC support to the following projects.

- **North Area ROW Maintenance Project Environmental Assessment, Western, Technical Editor/QA/QC (2006-2008).** Dr. Phinney provided technical editing and QA/QC support for all documents relating to the development of 800 miles of transmission lines in Northern California.
- **Sacramento Area Voltage Support Supplemental EIS/EA, Technical Editor/QA/QC (2006 – 2008).** Dr. Phinney provided technical editing and QA/QC support for all environmental documentation and permitting for new construction and reconstruction of transmission lines in the greater Sacramento area.

Vermont Yankee Nuclear Power Plant Report, Vermont Department of Public Service, Project Manager (December 2008 to January 2009). Dr. Phinney was the Project Manager and provided technical support for the environmental analysis of the continued operation of the Vermont Yankee Nuclear Power Station in Vernon, Vermont. The report assessed the environmental impacts to land, water and air resources (including climate change), soil and seismicity, on-site and off-site storage and disposal of high-level and low-level nuclear waste.

GenCorp 1999 to 2000

- As Vice President, Environmental and Regulatory Affairs, Dr. Phinney held primary responsibility for coordinating the company's aerospace and automotive environmental activities with various federal, State, and local regulatory agencies. Her specific responsibilities included: working with external groups and entities to develop responsible environmental legislation, regulations, and standards and the implementation of sound public policy; developing stakeholder base and strategy to ensure that company objectives were achieved; facilitating company and regulatory agency discussions to achieve more comprehensive and quicker remediation of sites; and spearheading a stakeholder group to develop and fund scientific studies on selected chemicals of concern.

Aerojet General Corporation 1984 to 1999

As Vice President, Environmental Health and Safety, Dr. Phinney ensured that programs were in place to meet all regulatory requirements and company initiatives. Her responsibilities included: providing strategic direction and management of all superfund-related investigation and remediation activities; developing environmental management plans; communicating environmental requirements, concerns, and successes to both internal and external audiences, including the board of directors, investment banking, and the analyst community; and participating as a member of the leadership council in defining company-wide business objectives and targets.

- Dr. Phinney created the first corporate EHS department, defining and staffing key functional areas. She managed a $20,000,000 annual budget and oversaw a staff of up to 30 professionals. Select accomplishments include: the development of remediation technologies that resulted in the cleanup of over 50 billion gallons of contaminated groundwater; development of the world's first groundwater treatment facility for perchlorate; significant reductions in emissions and hazardous waste generation; representation on numerous legislative and regulatory task forces and leadership positions on external business and community EHS committees and councils; and extensive public outreach efforts.

PREVIOUS EXPERIENCE, 1976 TO 1984

Jacobs Engineering Group. Dr. Phinney conducted toxicological, ecological, and air and water quality assessments.

Department of Environmental Science and Engineering at the University of California, Los Angeles. Dr. Phinney analyzed legal, economic, public health, and administrative barriers to waste water reuse. She also conducted an analysis of ecological and institutional factors in coastal siting of power plants.

Southwest Los Angeles Junior College. Dr. Phinney taught lecture and laboratory courses in general science.

TRAINING

- Certificate, Executive Program, University of California, Davis, 1989
- Expert Witness Training, California Energy Commission, 2001

HONORS AND AWARDS

- Who's Who of American Women, 18th Edition
- YWCA Outstanding Woman of the Year (Sciences) Award, 1992
- Woman of Achievement Award, Downtown Capitol Business and Professional Women, 1993
- Individual Award for Outstanding Contribution in Air Quality, 1995
- Sacramento Safety Center Incorporated, Eagle Award for Safety, 1998
- Regional Award for Outstanding Contribution in Air Quality, 2003

ACTIVITIES AND ASSOCIATIONS

- Editorial Board, The Environmental Professional, 1987-1989
- City of Sacramento Toxic Substances Commission, 1986-1988
- Sacramento Environmental Commission, 1988-1991
- Board of Directors, League of Women Voters of Sacramento, 1989-1999; President 1996-1997; Co-President 1997-1998; 2003-2005; Energy Study Committee 2005; Moderator/Facilitator of Debates and Forums (e.g., climate change, the SACOG's MTP, and flood control)
- Toxics Consultant, League of Women Voters of Sacramento, 1988-1989
- Member, Advisory Committee on AB 3777 (Risk Management Prevention Programs)
- Board of Directors, American Lung Association of Sacramento-Emigrant Trails, 1992-2000; President 1998-1999;
- Board of Directors, Sacramento Metropolitan Chamber of Commerce, 1992-1997; Vice President, Public Policy, 1996-1997
- Board of Directors, Air and Waste Management Association, 1991-1994
- Steering Committee Chair, Cleaner Air Partnership, 1993-1996, 2000-2001; Executive Committee 1993 to present
- Co-chair, TCE Issues Group, 1994-2000
- Sacramento Water Forum, 1995-2000
- Rate Advisory Committee, Sacramento Municipal Utility District, 1999-2001

SELECTED PUBLICATIONS/PRESENTATIONS

Phinney, S.L., Panel Moderator, Climate Change Initiatives for California, AEP Annual Conference, Shell Beach, California, 2007.

Phinney, S.L., Panel Moderator, Is there a Need for LNG in California, AEP Annual Conference, Shell beach, California, 2007.

Phinney, S.L., "LNG Safety Analysis in California – Federal, State and Local Processes" Presented at California Foundation on the Environment and the Economy, 2005.

Phinney, S.L., "Energy Basics" Presented at League of Women Voters of California Annual Convention, 2005.

Phinney, S.L., Presentation to U.S. Department of Justice, Office of the U.S. Attorney, on Women and Equality, 2004.

Phinney, S.L., "Trends in Industrial Waste Generation and Management" Presented at National Ground Water Association Conference, Las Vegas, Nevada, 1996.

Phinney, S.L., "Effective Management of an RI/FS to Reduce Financial Exposure," Manufacturers Alliance Environmental Management Council, Washington, D.C., 1995.

Phinney, S.L., "Knowing Your Compliance Challenge," 7th Annual California Statewide Community Awareness and Emergency Response (CAER) Conference, Sacramento, California, 1995.

Phinney, S.L., "Industry's Role in Broadening the Use of Alternative Fuels in America," Clean Cities Ceremony, Sacramento, California, 1994.

Phinney, S.L., "Aerospace Industry Perspective on Defense Conversion," AAAS Annual Meeting, San Francisco, California, 1994.

Phinney, S.L., "Aerojet's Waste Reduction Successes," Business for the Environment Conference, Sacramento, California, 1993.

Phinney, S.L., "Company Worker Trip Reduction Programs Under the Clean Air Act Amendments." MAPI Hazardous Materials Management Council, Washington, D.C., 1993.

Phinney, S.L., Testimony Before House Government Operations Subcommittee, 1993.

Phinney, S.L., Moderator, The Clean Air Act, A Public Forum, Sacramento, California, 1993.

Phinney, S.L., Plenary Session Chairperson and Speaker, "Business and the Environment: Must You Sacrifice One for the Other?" National Association of Environmental Professionals Conference, Seattle, Washington, 1992.

Phinney, S.L., "Facing the Challenge: The New California EPA." HazMat Northern California Conference, San Jose, California, 1992.

Phinney, S.L., "Understanding the Client Perspective." Environmental Business Conference, Pasadena, California, 1991.

Phinney, S.L., Panelist – Women of Science: Secrets of Success. Workshop, AAAS Annual Meeting, Washington, D.C., 1991.

Phinney, S.L., Keynote Address, ADPA International Symposium on Compatibility and Processing, San Diego, California, 1991.

Phinney, S.L., Keynote Address, Women in Science and Technology Conference, Jackson, Mississippi, 1991.

Phinney, S.L., Guest Speaker, Sacramento County Bar Association, Environmental Law Section, Sacramento, California, 1991.

Phinney, S.L., "Managing CERCLA Compliance from the Corporate Perspective." Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Phinney, S.L., and C.A. Fegan, "Identifying a Feasible, Effective Treatment Method for an Unusual Chemical of Concern." Proceedings, American Defense Preparedness Association 16th Environmental Symposium, New Orleans, Louisiana, 1988.

Phinney, S.L., "A Proactive Superfund Cleanup by Industry." Proceedings of the 4th Annual Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Thompson, C.H., S.L. Phinney and F.R. McLaren, "Aerojet: A Regional Site Program – Problem Definition." Proceedings of the Hazardous Waste and Environmental Emergencies Conference, Cincinnati, Ohio, 1985.

Kahane S.W., S.L. Phinney and A. Wright, "The Tightening Environmental Regulatory Climate for Hazardous Waste Management – Current Mandates and Future Directions for Industrial Compliance." Proceedings of the 1984 AlChE Summer National Meeting, Philadelphia, Pennsylvania, 1984.

Bachrach, A., D.M. Morycz, S.L. Phinney and S.W. Kahane, "Regulation and Offshore Oil and Gas Facilities." In: Emerging Energy/Environmental Trends and the Engineer. Eds. R.D. Nuefeld and R.W. Goodwins, 1983.

Lindberg, R.G., S.L. Phinney, J. Daniels and J. Hastings (eds)., "Environmental Assessment of the U.S. Department of Energy's Solar Thermal Technology Program." Prepared for the U.S. Department of Energy, June 1982.

Kahane, S.W., S.L. Phinney, J.A. Hill and R.C. Sklarew, "Key Considerations in Assessing the Air Impacts of Projected Outer Continental Shelf Oil and Gas Development," presented at the 74th Annual Air Pollution Control Association Meeting, Philadelphia, Pennsylvania, 1981

Phinney, S.L., "The U.S. Environmental Protection Agency's Pesticide Registration Program: A Case Study – Chloramben." Doctoral Dissertation, Environmental Science and Engineering Program, University of California, Los Angeles, California, 1981.

Phinney, S.L., (contributing author) et al. "Institutional Barriers to Wastewater Reuse in Southern California." Environmental Science and Engineering Report Prepared for the Office of Water Research and Technology, U.S. Department of the Interior, 1979.

Phinney, S.L., "Area-Restricted Feeding in American Plaice." Masters Thesis. Dalhousie University, Halifax, Nova Scotia, Canada, 1975.

DECLARATION OF
Patrick A. Pilling, Ph.D., P.E., G.E., D.GE.

I, **Patrick A. Pilling**, declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a Geotechnical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Geology and Paleontology**, for the **Palen Solar Power Project** based on my independent analysis of the Application for Certification, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 2, 2010 Signed: _____

At: Reno, Nevada

Patrick A. Pilling, Ph.D., P.E., G.E., D.GE.
President

Education

- B.S. – Civil Engineering –1986 – Santa Clara University
- M.S. – Civil Engineering – 1991 – San Jose State University
- Ph.D. – Civil Engineering – 1997 – University of Nevada, Reno

Registrations

- P.E. – Civil – Nevada, California, Oregon, Arizona, Utah, Idaho
- P.E. – Geotechnical – California, Oregon
- D.GE. – Diplomate, Geotechnical Engineering – Academy of Geo-Professionals

Experience

1997 to Present: Black Eagle Consulting, Inc. Dr. Pilling acted as the Executive Vice President from 1997 until the end of 2007, and assumed the role of President of Black Eagle Consulting, Inc. in January 2008. Dr. Pilling maintains more than 20 years of construction, geotechnical, transportation, and mining engineering experience, and has supervised the engineering and construction of such projects throughout the western United States and South America. Dr. Pilling oversees daily office operations, including personnel and accounting issues, coordinating company marketing efforts, and performing project management, engineering and laboratory analyses, and report preparation on most projects. Over the past 8 years, Dr. Pilling has assisted the California Energy Commission (CEC) in reviewing geology and paleontology portions of Applications for Certification (AFC) for various power plants throughout the State of California. The power plants included:

Valero Cogeneration Project
Colusa Energy Project
Central Valley Energy Center
Blythe Energy Project Phase II
Tesla FPL Project
Eastshore Energy Center
Panoche Energy Center
Niland Gas Turbine Power Plant
Los Esteros Critical Energy Facility
Pico Power Project
Roseville Energy Center
Contra Costa Energy Project
Gilroy II Project
San Francisco Electric Reliability Project
Russell City Energy Center
Starwood Energy Center
Ivanpah Solar Plant
Marsh Landing Generating Station
Willow Pass Generating Station
Tracy Expansion
Lodi Energy Center
San Joaquin Solar 1 & 2
Vacaville CPV
Mariposa Energy Project

1996 to 1997: SEA, Incorporated; Senior Geotechnical Engineer. Dr. Pilling provided project coordination, management, supervision, and development, and performed field exploration, engineering analyses, and report preparation.

1990 to 1996: WESTEC; Project Manager. Mr. Pilling was responsible for general geotechnical analyses on most projects, as well as design, management, and permitting of heap leach and tailings storage facilities projects. His

experience varied from foundation design recommendations for small pump house structures to detailed liquefaction and seepage/slope stability analyses for large earthen embankments.

1986 to 1990: Case Pacific Company; Project Manager. Mr. Pilling provided cost estimating, project management, and contract negotiation on a wide variety of projects.

Affiliations

- American Concrete Institute: Concrete Field Testing Technician Grade I
- National Society of Professional Engineers
- Secretary/Treasurer - National Society of Professional Engineers, Northern Nevada Chapter
- American Society of Civil Engineers
- International Association of Foundation Drilling
- National Council of Examiners for Engineering and Surveying

Publications

Ashour, M., P. A. Pilling, and G. M. Norris, "Documentation of the Strain Wedge Model Program for Analyzing Laterally Loaded Isolated Piles and Pile Groups," Proceedings, 32nd Symposium on Engineering Geology and Geotechnical Engineering, Boise, Idaho, March 1997.

Ashour, M., P. A. Pilling, G. M. Norris, and H. Perez, "Development of a Strain Wedge Model Program for Pile Group Interference and Pile Cap Contribution Effects," Report No. CCEER-96-4, University of Nevada, Reno, 1996.

Ashour, M., Norris, G., and Pilling, P., "Lateral Loading of a Pile in Layered Soil Using the Strain Wedge Model," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, April 1998, pp. 303-315.

Norris, G. M., M. Ashour, P. A. Pilling, and P. Gowda, "The Non-Uniqueness of p-y Curves for Laterally Loaded Pile Analysis," Proceedings, 31st Symposium on Engineering Geology and Geotechnical Engineering, Logan, Utah, March 1995, pp. 40-53.

Pilling, P. A., "The Response of a Group of Flexible Piles and the Associated Pile Cap to Lateral Loading as Characterized by the Strain Wedge Model," Doctoral Dissertation, University of Nevada, Reno, 1997.

Pilling, P.A., Ashour, M., and Norris, G., "Strain Wedge Model Hybrid Analysis of a Laterally Loaded Pile Group," Transportation Research Board Paper No. 01-0174, 2001.

Pilling, P. A. and P. V. Woodward, "Dependent Facility Closure in California," Proceedings, Mine Closure: Creating Productive Public and Private Assets, Sparks, Nevada, March 1995, pp. 315-326.

Pilling, P.A. and Beeston, H. E., "Expansion Testing of Clay Soils in Forensic Investigations," Proceedings, 33rd Symposium on Engineering Geology and Geotechnical Engineering, Reno, Nevada, March 1998, pp. 119-127.

Pilling, P.A., M. Ashour, and G.M. Norris, "Strain Wedge Model Hybrid Analysis of Laterally Loaded Pile Group," Journal of the Transportation Research Board, Transportation Research Record No. 1772, 2001, Paper No. 01-0174, pp. 115-121.

DECLARATION OF
Erin Bright

I, **Erin Bright,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting Transmission and Environmental Protection Division as a **Mechanical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Power Plant Efficiency** and **Power Plant Reliability** for the **Palen Solar Power Project** based on my independent analysis of the Application, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 11, 2010 Signed: _____

At: Sacramento, California

Erin Bright
Mechanical Engineer

Experience Summary

Two years of experience in the electric power generation field, including analysis of noise pollution, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues. One year of experience in the alternative energy field, including analysis of alternative fuel production and use.

Education

- University of California, Davis--Bachelor of Science, Mechanical Engineering and Materials Science
- University of California, Davis Extension Program--Renewable Energy Systems

Professional Experience

2007 to Present-- Mechanical Engineer, Energy Facilities Siting Division - California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

2006 to 2007--Energy Analyst, Fuels & Transportation Division - California Energy Commission

Performed analysis of use potential and environmental effects of emerging non-petroleum fuels, including compressed natural gas, biomass, hydrogen and electricity, in heavy and light duty transportation vehicles. Contributor to Energy Commission's alternative fuels plan.

DECLARATION OF

Sudath A.Edirisuriya

I, Sudath A.Edirisuriya declare as follows:

I am presently employed by the California Energy Commission in the Engineering Office of the Systems Assessments and Facilities Siting Division as an Electrical Engineer.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the staff testimony on Transmission System Engineering for the Palen Solar Energy Project based on my independent analysis and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Sudath A. Edirisuriya

Date: August 26, 2010. Signed: Sudath A.Edirisuriya

At: Sacramento, California

Sudath Edirisuriya

EDUCATION:
Bachelor of Science in Electrical Engineering at California State University Fullerton

ATTAINMENTS:
Member of the Professional Engineers in California Government
Vice President Electrical Engineering Society-California State University Fullerton.

EXPERIENCE:

November-2001 to Present: - Associate Electrical Engineer, System Assessment and Facilities Siting Division, California Energy Commission.
Conduct and perform planning studies and contingency analysis including power flow, short-circuit, stability, and post-transient analysis to maintain reliable operation of the power system. Investigates and analyzes Grid Planning problems and provides appropriate information to Grid Planning Engineers. Develops automated computer programs and other advance analysis methods for comprehensive evaluation of the operational performance of the transmission system.
Understanding of regulatory and reliability guidelines, WECC and NERC planning and operation criteria, CPUC and FERC requirements. Review technical analyses for WECC/ISO/PTO transmission systems and proposed system additions; provide support and analyses associated with Reliability Must-Run (RMR) contracts and the Local Area Reliability Services (LARS) process; review new generation interconnection studies; provide congestion analyses; and provide support for regulatory filings.

June-1998 to November-2001: - Project Electrical Engineer, Design Electrical Engineering Section, Department of Transportation, California.
Electrical Engineering knowledge and skills in the design, construction and maintenance of California state work projects involving all the public work areas; contract administration, construction management, plan checking, field engineering and provide liaison with consultants, developers, and contractors. Plan review in facility constructions, highway lighting, sign lighting, rest area lighting, preparation of project reports, cooperative agreements, review plans for compliance of construction and design guide lines for national electrical code, standards and ordinance. Review process included breaker relay coordination, detail wiring diagrams, layout details, service coordination, load, conductor sizes, derated ampacity, voltage drop calculations, harmonic and flicker determination.

June-1993 to May-1998:- Substation Electrical Engineer, City of Anaheim, California.
Performed protective relay system application, design and setting determination in Transmission & Distribution Substation. Understanding of principles of selective coordination system protection and controls for Electric Utility Equipment. Understanding of Power theory and Analysis of symmetrical components. Ability to review engineering plans, specifications, estimates and computation for Electrical Utility Projects. Practices of Electrical Engineering design, to include application of Electro-mechanical and solid state relays in Electrical Power Systems. Software skills in RNPDC (Fuse Coordination Program), Capacitor bank allocation program, and Load Flow Program. Design projects using CAD, Excel spread sheets including cost estimates, wiring diagrams, material specifications and field coordination.
Performed underground service design 12kV and 4kV duct banks; pole riser; getaway upgrade; voltage drop calculation, ampacity calculation and wiring diagrams. Design and

maintence of substations in City Electrical Utility System. Upgrade Station Light and power transformers; upgrade capacitor banks; replacement of 12kV-4kV power circuits; Breakers at Metal Clad Switchgear. Design one-line diagrams; three line diagrams; grounding circuits; schematics; coordination of relay settings; conduit and material list preparation. Calculation of derated ampacity; inrush current, short circuit current and fault current.

DECLARATION OF
Mark Hesters

I, **Mark Hesters**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission and Environmental Protection Division** as a Senior Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Transmission System Engineering**, for the **Palen Solar Power Plant**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/11/10 Signed: _____

At: Sacramento, CA_____

Mark Hesters

916-654-5049
mark.hesters@energy.state.ca.us

Qualifications

- Analyzed the reliability impacts of electric power plants for nine years.
- As an expert witness, produced written and oral testimony in numerous California Energy Commission proceedings on power plant licensing.
- Expertise in power flow models (GE PSLF and PowerWorld), production cost models (GE MAPS), Microsoft word-processing, spreadsheet and database programs.
- Contributing author to many California Energy Commission reports.
- Represented the Energy Commission in the development of electric reliability and planning standards for California.

Experience

Senior Electrical Engineer

2005-Present California Energy Commission, Sacramento, CA

- Program manager of the transmission system engineering analysis for new generator Applications of Certification.
- Lead the development of transmission data collection regulations.
- Overhauled the transmission data adequacy regulations for the Energy Commission's power plant certification process.
- Participated in the analysis of regional transmission projects.
- Technical lead for Commission in regional planning groups.
- Energy Commission representative to the Western Electric Coordinating Council Operations Committee.

Associate Electrical Engineer

1998–2005 California Energy Commission, Sacramento, CA

- Lead transmission systems analyst for power plant licensing under 12-month, 6-month and 21-day licensing processes.
- Provided expert witness testimony on the potential transmission impacts of new power plants in California Energy Commission licensing hearings.
- Authored chapters for California Energy Commission staff reports on regional transmission issues.
- Studied the economics of transmission projects using electricity production simulation tools.
- Analyzed transmission systems using the GE PSLF and PowerWorld load flow models.
- Collected and evaluated transmission data for California and the Western United States

Electric Generation Systems Specialist

1990–1998 California Energy Commission, Sacramento, CA

- Lead generation planner for southern California utilities.
- Analyzed electric generation systems using complex simulation tools.
- Provided analysis on the impact of resource plans on air quality and electricity costs for California Energy Commission reports.
- Developed modeling characteristics for emerging technologies.
- Evaluated resource plans.

Education

1985–1989 University of California at Davis Davis, CA

- B.S., Environmental Policy Analysis and Planning

DECLARATION OF
Dale Rundquist

I, Dale Rundquist declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Compliance Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the General Conditions Including Compliance Monitoring and Closure Plan for the Palen Solar Power Project (09-AFC-7) Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/30/2010

Signed: Dale Rundquist

At: Sacramento, California

DALE RUNDQUIST

Compliance Project Manager

EXPERIENCE SUMMARY

Over 30 years in project and staff management experience with the California Energy Commission (CEC), Bel Air Markets, and the US Army. Extensive experience in managing people and projects, and resolving difficult situations.

PROFESSIONAL EXPERIENCE AND EDUCATION

ENERGY COMMISSION COMPLIANCE PROJECT MANAGER 09/07 to Present
Worked as a Compliance Project Manager (CPM) for the California Energy Commission, in the Compliance Unit of the Siting, Transmission and Environmental Protection Division. Monitored the construction of two power plant projects (Inland Empire (01-AFC-17C) and Panoche Energy Center (06-AFC-5C)), and the operation of several other power plants(ACE (86-AFC-1C), Bottle Rock Geothermal(79-AFC-4C), Crockett Cogeneration(92-AFC-1C), Midway Sunset Cogeneration (85-AFC-3C), and Palomar Energy Project (01-AFC-24C)).

MANAGER/SUPERVISOR FOR BEL AIR MARKETS 11/74 to 09/07
Worked for Bel Air Markets for over thirty-two years starting on Night Stock Crew. Worked in a management capacity for twenty-eight years. Worked at several stores throughout the greater Sacramento area, managing 4 stores. Involved in scheduling employees, projecting sales on a weekly, monthly and yearly basis, resolving employee/customer disputes, controlling labor, developing business plans, ordering merchandise, and overall operation of the entire store.

US ARMY 02/69 to 02/71
Infantry Sergeant; Fort Lewis, Washington, Viet Nam.

EDUCATION 09/63 to 06/74
Bachelor of Arts Degree in Biological Sciences and a Minor Degree in Business Administration from California State University, Sacramento (1974).

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 *PALEN SOLAR POWER PLANT PROJECT*

Docket No. 09-AFC-7

PROOF OF SERVICE
(Revised 8/27/10)

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*indicates change

DECLARATION OF SERVICE

I, Hilarie Anderson, declare that on September 1, 2010, I served and filed copies of the attached Revised Staff Assessment, Part 1. 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: [**http://www.energy.ca.gov/sitingcases/solar_millennium_palen**]

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(***Check all that Apply***)

FOR SERVICE TO ALL OTHER PARTIES:

___✔___ sent electronically to all email addresses on the Proof of Service list;

_____ by personal delivery;

_____ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

___✔___ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-7
1516 Ninth Street, MS-4
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.

Original Signature in Dockets
Hilarie Anderson

*indicates change