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BLYTHE SOLAR POWER PROJECT

Staff Assessment - Part A

Amendment to the Blythe Solar Power Project

CALIFORNIA
ENERGY COMMISSION
Edmund G. Brown, Jr., Governor

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BLYTHE SOLAR POWER PROJECT (09-AFC-6C)
STAFF ASSESSMENT – Part A
Amendment to the Blythe Solar Power Project

EXECUTIVE SUMMARY

Testimony of Mary Dyas

INTRODUCTION

This Staff Assessment (SA) Part A is being published by California Energy Commission (Energy Commission) staff for the proposed revised petition to amend for the Blythe Solar Power Project (BSPP). The modified project, owned by NextEra Blythe Solar Energy Center, LLC (NextEra Blythe Solar), proposes to change the solar thermal power-generating technology of the approved project from parabolic trough technology to photovoltaic (PV) generating technology.

On June 28, 2012, Palo Verde Solar I, LLC (PVSI), the original project owner, filed a petition with the California Energy Commission (Energy Commission) requesting to modify the Blythe Solar Power Project by replacing the solar thermal technology completely with photovoltaic (PV) generating technology. On April 12, 2013, NextEra Blythe Sola Energy Center, LLC (NextEra Blythe Solar), current owner of the BSPP, filed a Revised Petition to Amend with the Energy Commission requesting to modify the approved BSPP (http://www.energy.ca.gov/sitingcases/blythe_solar/) to change the solar thermal power-generating technology of the approved project from parabolic trough technology to photovoltaic (PV) technology.

This SA Part A contains staff's independent, objective evaluation of NextEra Blythe Solar's Revised Petition to Amend (09-AFC-6C) for all technical areas except biological resources and cultural resources which will be provided in Part B. The staff analyses in the SA are similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA) except they also include an engineering assessment.

Section 25500.1 of the Public Resources Code authorizes the Energy Commission to review amendments to convert proposed solar thermal power plants, approved by the Energy Commission, and which is on federal land, to the use of photovoltaic (PV) technology. Section 25500.1 only applies to projects such as BSPP that meet certain requirements. Section 25500.1(d), requires the Commission to utilize its amendment process under Section 1769 of Title 20 of the California Code of Regulations.

For an amendment for an existing power plant over which it has regulatory oversight, the Energy Commission is the lead state agency under CEQA. The Energy Commission's certified regulatory program provides the environmental analysis that satisfies CEQA requirements. In fulfilling this responsibility, Energy Commission staff provides an independent assessment of the amendment's engineering design, evaluates its potential effects on the environment and on public health and safety, and determines whether the project, if modified, would remain in conformance with all applicable local, state, and federal laws, ordinances, regulations and standards (LORS). Energy Commission staff also recommends any needed modifications to existing mitigation measures required by the conditions of certification in the Energy

Commission Final Decision and proposes additional conditions of certification to mitigate any significant adverse environmental effects of the proposed modifications.

For the ease of the reader, this SA provides a description of the environmental setting of the entire project. However, because this is an amendment to an existing Energy Commission license, staff's analysis focuses on the technology change proposed for the BSPP in the Revised Petition to Amend. These specific changes are explained in detail in the **PROJECT DESCRIPTION** section. A summary of the BSPP project is provided below.

This SA 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, and federal LORS. This document will serve as staff's testimony in evidentiary hearings to be held by the assigned Committee of two Commissioners. In the evidentiary hearings, the Committee will consider the recommendations presented by staff, the applicant, intervenors, governmental agencies, tribes, and the public prior to submitting its proposed decision (Presiding Member's Proposed Decision [PMPD]) to the full Commission. Following a 30-day comment period and a public hearing(s), the full Energy Commission will make a final decision on the PMPD.

PROPOSED PROJECT LOCATION AND DESCRIPTION

The BSPP, as licensed by the Energy Commission on September 15, 2010, is a 1,000-megawatt (MW) solar thermal power-generating facility utilizing parabolic trough technology on approximately 7,043 acres. The project site is located approximately 8 miles west of the City of Blythe and 2 miles north of the Interstate-10 freeway, on land managed by the Bureau of Land Management (BLM) in Riverside County, California.

The modifications proposed in the revised Petition to Amend include replacing the parabolic trough solar collection system, associated heat transfer fluid and steam turbine with PV modules. The PV modules will consist of a tracker system, fixed tilt system, or combination of the two systems. NextEra Blythe Solar is requesting the Decision be amended to allow the specific combination of PV technologies to be selected prior to construction without the need for filing another amendment.

The modified BSPP would be comprised of four phases designed to generate a total of approximately 485 MW (nominal) of electricity when completed. The first three units (phases) would consist of approximately 125 MW alternating current (AC) each. The fourth unit would generate approximately 110 MW AC. All four units would share an operations and maintenance facility, one on-site switchyard, access and maintenance roads, perimeter fencing and other ancillary security facilities, and a 230-kV gen-tie line. The transmission corridor is located in the center of the site with the exact alignment within the corridor to be determined during final design.

PURPOSE AND NEED FOR AN AMENDMENT

Palo Verde Solar I, LLC originally proposed the use of concentrating solar technology for the BSPP site. Well after the Commission issued its Final Decision in 2010, Solar Millennium AG, owner of PVSI, filed insolvency proceedings in Germany. The Energy Commission approved a change in ownership of the BSPP from PVSI to NextEra Blythe Solar, on July 11, 2012. NextEra Blythe Solar desires to convert the solar generation technology from concentrated solar troughs to PV technology. The change in ownership and the change in technology could not be anticipated in September of 2010 when the BSPP was certified by the Energy Commission.

U.S. BUREAU OF LAND MANAGEMENT COORDINATION

The approved BSPP site is located entirely on land managed by the BLM. During the original BSPP proceeding in 2009 and 2010, Energy Commission staff and BLM staff worked closely together on the review and analysis of the project. The Energy Commission and BLM issued separate final documents for compliance with CEQA and NEPA, respectively. The Energy Commission issued its Final Decision on September 15, 2010. The BLM published the Plan Amendment/Record of Decision (PA/ROD) on October 22, 2010, and issued the ROW Grant on November 4, 2010. For the modified BSPP to be constructed, a revised ROW grant from BLM will be required in addition to the amended certification from the Energy Commission. NextEra Blythe Solar is currently working with the BLM on moving forward to produce a new environmental document. Energy Commission staff will continue to work cooperatively with BLM staff to review the modified BSPP.

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A Reclamation & Decommissioning Plan is required per the conditions of certification. This document in conjunction with the **General Conditions** provided in this SA, will outlined the requirements for facility closure of BSPP.

Although the Energy Commission and BLM are not publishing a joint document for the BSPP, the Energy Commission and the BLM continue to share staff expertise, information, and documentation in order to promote intergovernmental coordination at the state and federal levels.

CUMULATIVE IMPACTS

See **Attachment A** at end of the section.

ENVIRONMENTAL JUSTICE

Environmental justice communities are commonly identified as those where residents are predominantly minorities or low-income; where residents have been excluded from the environmental policy setting or decision-making process; where they are subject to a disproportionate impact from one or more environmental hazards; and where residents experience disparate implementation of environmental regulations, requirements, practices, and activities in their communities. Environmental justice efforts attempt to address the inequities of environmental protection in these communities.

An environmental justice analysis is composed of three parts:

1. identification of areas potentially affected by various emissions or impacts from a proposed project;
2. a determination of whether there is a significant population of minority persons or persons below the poverty level living in an area potentially affected by the proposed project; and
3. a determination of whether there may be a significant adverse impact on a population of minority persons or persons below the poverty level caused by the proposed project alone, or in combination with other existing and/or planned projects in the area.

CALIFORNIA RESOURCES AGENCY

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” (Gov. Code §65040.12; Pub. Resources Code, §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 or taking actions that affect the environment;

- providing funding for activities affecting the environment; and
- interacting with the public on environmental issues.

DEMOGRAPHIC SCREENING ANALYSIS

For all siting cases, Energy Commission staff uses a demographic screening tool (**Socioeconomic Figure 1**) as part of its CEQA analysis. Based on 2010 census block data, Socioeconomic Figure 1 shows the percentage of the minority population within the six-mile buffer of the project site. The Council on Environmental Quality's *Environmental Justice: Guidance Under the National Environmental Policy Act*, dated December, 1997, 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.

The *Final Guidance for Incorporating Environmental Justice Concerns in USEPA's National Environmental Policy Act (NEPA) Compliance Analysis*, dated April, 1998, considers a minority population to be present when the minority population of the potentially affected area is greater than 50 percent or when the minority population percentage is meaningfully greater than the minority population in the general population or other appropriate unit of geographic analysis. That guide also provides staff with information on outreach and public involvement.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES AND MITIGATION

Below is a summary (**Executive Summary Table 1**) of environmental consequences and mitigation proposed in this Staff Assessment.

Executive Summary Table 1
Environmental and Engineering Assessment

Technical Area	Original Final Decision		Revised Petition to Amend	
	Complies with LORS	Impacts Mitigated	Complies with LORS	Impacts Mitigated
Environmental Assessment				
Air Quality/Greenhouse gases	Yes	Yes	Yes	Yes
Biological Resources	Yes	Yes	To be provided in Part B	To be provided in Part B
Cultural Resources	Yes	Yes	To be provided in Part B	To be provided in Part B
Hazardous Materials	Yes	Yes	Yes	Yes
Land Use	No	No	To be provided in Part B	To be provided in Part B
Noise and Vibration	Yes	Yes	Yes	Yes
Public Health	Yes	Yes	Yes	Yes
Socioeconomics	Yes	N/A	Yes	Yes
Soil and Water Resources	Yes	Yes	Yes	Yes
Traffic & Transportation	Yes	Yes	To be provided in Part B	To be provided in Part B

Transmission Line Safety/Nuisance	Yes	Yes	Yes	Yes
Visual Resources	Yes	No	To be provided in Part B	To be provided in Part B
Waste Management	Yes	Yes	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes	Yes	Yes
Engineering Assessment				
Facility Design	Yes	Yes	Yes	Yes
Geology & Paleontology	Yes	Yes	Yes	Yes
Power Plant Efficiency	N/A	N/A	N/A	N/A
Power Plant Reliability	N/A	N/A	N/A	N/A
Transmission System Engineering	Yes	Yes	Yes	Yes
Alternatives	N/A	N/A	To be provided in Part B	To be provided in Part B

ENVIRONMENTAL AND ENGINEERING ASSESSMENT

AIR QUALITY/GREENHOUSE GASES

Energy Commission staff concludes that with the adoption of proposed conditions of certification, the proposed modified BSPP would comply with all applicable laws, ordinances, regulations, and standards and would not result in any significant CEQA air quality impacts.

Staff concludes that the proposed project would not have the potential to exceed Prevention of Significant Deterioration emission threshold levels during direct source operation and the facility is not considered a major stationary source with potential to cause adverse National Environmental Policy Act (NEPA) air quality impacts. The modified BSPP would emit substantially lower greenhouse gas[1] emissions per megawatt-hour than fossil fueled generation resources in California. The modified BSPP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission (GHG) Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

BIOLOGICAL RESOURCES

Biological Resources will be published in Part B of the SA. It is anticipated that Part B will be published the week of September 30, 2013.

CULTURAL RESOURCES

Cultural Resources will be published in Part B of the SA. It is anticipated that Part B will be published the week of September 30, 2013.

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

HAZARDOUS MATERIALS

Staff's evaluation of the modified BSPP indicates that due to the nature of the materials used and the engineering and administrative controls that would be implemented to prevent and control accidental releases of hazardous materials, hazardous material use, storage, and transportation would not pose a significant impact on the public. Because of this determination, and the additional fact that there are no existing or future foreseeable facilities in the immediate proximity (less than 1 mile) using large amounts of hazardous chemicals, there is little (if any) possibility that vapor plumes would mingle (combine) to produce an airborne concentration that would present a significant cumulative risk should an accidental release occur. With adoption of the proposed conditions of certification, the proposed project would comply with all applicable LORS. Other proposed conditions of certification address the issues of site security matters.

Staff recommends that the Energy Commission impose proposed conditions of certification to ensure that the modified BSPP is designed, constructed, and operated in compliance with applicable LORS, and would protect the public from significant risk of exposure to an accidental release of hazardous materials. If all mitigation proposed by the applicant and by staff are implemented, the use, storage, and transportation of hazardous materials would not present a significant risk to the public.

LAND USE

Land Use will be published in Part B of the SA. It is anticipated that Part B will be published the week of September 30, 2013.

NOISE AND VIBRATION

The power blocks, the air-cooled condensers, and associated thermal-power equipment are the main sources of noise and vibration impacts for the approved project. By eliminating the parabolic trough technology (and thus, these components) and replacing it with the photovoltaic technology, the modified project would not generate substantial noise during project operations. Also, the project's footprint has been modified and the nearest noise-sensitive receptor (LT) would be much further away from the modified project site boundary than the approved project.

Construction-related noise and vibration impacts would also be less than the approved project due to substantially less grading and other construction activities, and the elimination of the concrete batch plant previously proposed for the approved project. Nevertheless, because construction may involve heavy equipment and noisy activities, the conditions of certification related to construction remain unchanged.

Because construction and operational noise impacts would be less than those from the approved project, the modified BSPP, if built and operated in conformance with the proposed conditions of certification, 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.

PUBLIC HEALTH

Staff has analyzed potential public health risks associated with construction and operation of the proposed BSPP 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 BSPP 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 proposed BSPP project would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

Four small wet cooling towers were proposed in the approved BSPP for ancillary equipment. The condition of certification **PUBLIC HEALTH-1** was proposed to require the cooling towers to implement aggressive water treatment and biocide application programs. Since the cooling towers proposed in approved BSPP would no longer be needed; staff recommends condition of certification **PUBLIC HEALTH-1** be eliminated.

SOCIOECONOMICS

Staff concludes that the construction and operation of the modified project would not cause a significant adverse direct or indirect impact or contribute to a cumulative socioeconomic impact on the area's housing, schools, law enforcement services, or parks. The project would not induce a substantial population growth or displacement of population, or induce substantial increases in demand for housing, parks, or law enforcement services.

Staff concludes the population in the six-mile project buffer constitutes an environmental justice population as defined by *Environmental Justice: Guidance under the National Environmental Policy Act*. The total minority population within the six-mile project buffer is 59 percent, as shown in **Socioeconomics Figure 1**. As the demographic screening area as a whole exceeds 50 percent, staff in the 13 technical areas identified in the Executive Summary has considered environmental justice in their environmental impact analysis.

SOIL & WATER RESOURCES

Staff has determined that construction, operation, and closure of the proposed modified BSPP could potentially impact soil and water resources. Where these potential impacts have been identified, staff has proposed mitigation measures, as conditions of certification to reduce identified impacts to levels that are less than significant. If recommended conditions of certification are implemented, the project would conform to all applicable laws, ordinances, regulations and standards (LORS).

TRAFFIC & TRANSPORTATION

Traffic & Transportation will be published in Part B of the SA. It is anticipated that Part B will be published the week of September 30, 2013.

TRANSMISSION LINE SAFETY AND NUISANCE

As with the approved BSPP, the proposed tie-in line would be a single-circuit 230-kilovolt (kV) transmission line connecting the project's on-site 230-kV switchyard to the SCE Colorado River Substation. This substation is under the jurisdiction of the California Public Utilities Commission (CPUC) and the Bureau of Land management (BLM); therefore, staff's analysis for the approved project was for the proposed tie-in project line as it stretches from the on-site substation and ends at the 230-kV CRS substation. The route and construction plan for the modified BSPP's line would remain essentially the same as for the approved project meaning that the field and non-fields would be encountered at the same levels as with the approved project. These impacts would remain below levels of potential significance and staff does not recommend any changes to the five conditions of certification as already approved.

VISUAL RESOURCES

Visual Resources will be published in Part B of the SA. It is anticipated that Part B will be published the week of September 30, 2013.

WASTE MANAGEMENT

The proposed amended BSPP would employ PV technology, which would eliminate the existing approved parabolic trough technology and need for heat transfer fluid (HTF). With the elimination of HTF and the waste management requirements related to this fluid, condition of certification **WASTE-8** is no longer required.

Management of the non-hazardous and hazardous waste generated during construction, operation, and closure of the modified BSPP would not result in significant adverse impacts under CEQA guidelines. The modified BSPP would be consistent with applicable waste management laws, ordinances, regulations, and standards (LORS) provided that the measures proposed by the applicant and mitigation proposed by staff are implemented.

WORKER SAFETY AND FIRE PROTECTION

Staff concludes that if the project owner provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program for the modified project, as required by the existing and partially revised Conditions of Certification **WORKER SAFETY-1**and **-2** and fulfils the requirements of the existing or newly proposed Conditions of Certification **WORKER SAFETY-3** through **-11**, the modified BSPP would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards (LORS). The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed 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 LORS.

Staff has considered all relevant information as well as past experience at other solar photovoltaic power plants in California and elsewhere and has determined that the modified project would cause a significant direct impact on local fire protection services but not cause a significant cumulative impact. A direct impact is caused by the need to equip and train the fire department to respond to the specific unique hazards posed by solar Photovoltaic (PV) technology which although not new to the county, poses certain unique safety hazards that would pose a risk to emergency responders. No significant cumulative impact would occur because the construction and operation of this solar PV plant is not likely to change the overall hazard profile of facilities requiring emergency response in the county, emergency events at this solar PV plant are not likely to escalate within or beyond the power plant site, and emergencies are not likely to occur simultaneously with other facilities. Therefore, staff is proposing mitigation to reduce these impacts to less than significant by requiring payment to the Riverside County Fire Department (RCFD) for capital and operations and maintenance support (see proposed Conditions of Certification **WORKER SAFETY-7**).

FACILITY DESIGN

Staff concludes that the design, construction, and eventual closure of the modified BSPP and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed conditions of certification would ensure compliance with these laws, ordinances, regulations and standards.

GEOLOGY AND PALEONTOLOGY

Staff believes that the potential is low for significant adverse impacts to the proposed project from geologic hazards during its design life. The potential for significant adverse impacts to potential geologic and mineralogic resources from the construction, operation, and closure of the proposed project is also low.

In areas where soils are exposed by conventional excavation operations, potential impacts to paleontologic resources would be mitigated through worker training and monitoring by qualified paleontologists, as required by the existing BSPP conditions. Existing studies indicate the soils beneath the solar field are likely to contain Pleistocene-age vertebrate fossils. Based on existing information, the proposed method of construction would create a significant impact to paleontological resources in the area where PV modules are proposed. Staff has proposed conditions of certification to reduce the impacts to less than significant.

POWER PLANT EFFICIENCY

Staff estimates that the modified BSPP would produce electric energy within a range of 1,052 to 1,450 gigawatt hours (GWh) annually, depending on the mix of fixed and tracking PV panels. The modified BSPP would use solar energy to generate all of its capacity. The project would decrease reliance on fossil fuel, and would increase the utilization of 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. The modified BSPP would generate approximately 0.12 MW per acre of land (or occupy approximately 8.4 acres per MW); roughly equivalent to other solar power technologies. Staff concludes that the BSPP's generating technology is comparable to land use-efficient solar technologies currently available. No conditions of certification are proposed.

POWER PLANT RELIABILITY

The project owner has not assigned an availability factor that would lead to the conclusion that PV electric power generation is a mature technology. However, adequate design and construction practices would provide an adequate level of reliability and the attendant availability to support a satisfactory level of reliability. (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 modified project, staff concludes that the modified BSPP would be built and would operate in a manner consistent with industry norms for reliable operation. No conditions of certification are proposed.

TRANSMISSION SYSTEM ENGINEERING

The modified BSPP 230-kV switchyard, single 230-kV overhead generator tie-line and its termination at the proposed Southern California Edison (SCE) Colorado River 230-kV substation are adequate and in accordance with industry standards and good utility practices and are acceptable to Staff according to engineering laws, ordinances, regulations and standards (LORS).

Staff's proposed Condition of Certification **TSE -5** requires the submittal of the modified 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.

ALTERNATIVES

Alternatives will be published in Part B of the SA. It is anticipated that Part B will be published the week of September 30, 2013.

REFERENCES

OPR 2013—The Governor’s Office of Planning and Research (OPR), CEQAnet Database. Accessed May, 2013. On-line http://www.ceqanet.ca.gov/

Riverside County 2013—Riverside County Planning Department. Accessed May, 2013. On-line http://www.tlma.co.riverside.ca.us/planning/

PVSI2009a. Palo Verde Solar I, LLC (TN 52937). Blythe Solar Power Project Application for Certification Volumes 1 & 2. Submitted to the CEC on August 24, 2009.

EXECUTIVE SUMMARY ATTACHMENT A

CUMULATIVE IMPACTS

Preparation of a cumulative impact analysis is required under CEQA. In the 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)).

DEFINITION OF THE CUMULATIVE PROJECT SCENARIO

Cumulative impacts analysis is intended to identify past, present, and probable future actions that are closely related either in time or location to the project being considered, and consider how they have harmed or may harm the environment. Most of the projects listed in the cumulative projects tables (**Executive Summary Tables 1, 2, 3,** and **4)** and corresponding figure (**Executive Summary Figure 1 and Figure 1A**) have, are, or will be required to undergo their own independent environmental reviews 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 SA uses the “list approach” for purposes of state law to provide a tangible understanding and context for analyzing the potential cumulative effects of the proposed 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. All projects used in the Cumulative Impacts Analysis for this SA are provided in cumulative projects tables. **Executive Summary Figure 1 and Figure 1A,** presented at the end of this section, shows projects within 50 miles of the BSPP site. 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, which may exceed the 50-mile buffer shown in **Figure 1**.

APPROACH TO CUMULATIVE IMPACT ANALYSIS

This SA 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 BSPP could combine with those of other projects.
- Evaluate the effects of the BSPP in combination with past and present (existing) projects within the area of geographic effect defined for each discipline.
- Evaluate the effects of the BSPP with foreseeable future projects that occur within the area of geographic effect defined for each discipline. This section is divided into Foreseeable Future Projects and Foreseeable Renewable Projects in the California Desert for ease of the reader.

Executive Summary Attachment A Table 1
Blythe Solar Power Project – Cumulative Impacts (Existing Projects)

Project Name	Location	Ownership	Status	Project Description	Approximate Distance From Project Site (Miles)	Feature
Chuckwalla Valley State Prison	19025 Wiley's Well Rd., Blythe, CA	CA Dept. of Corrections & Rehabilitation	Existing	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	11.48	Polygon
Ironwood State Prison	19005 Wiley's Well Rd., Blythe, CA	CA Dept. of Corrections & Rehabilitation	Existing	ISP jointly occupied 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	12.38	Polygon
Blythe Energy Project	City of Blythe, north of I-10, 7 miles west of the CA/AZ border	Blythe Energy, LLC	Existing	520 MW combined-cycle, natural gas-fired electric-generating facility. Project is connected to the Buck Substation owned by the Western Area Power Administration (Western)	5.62	Point
West-wide Section 368 Energy Corridors	Riverside County, parallel to DPV corridor	BLM, Department of Energy (DOE), U.S. Forest Service	Approved by BLM and U.S. Forest Service	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	10.52	Polygon
Eagle Mountain Pumping Plant	Eagle Mountain Rd, west of Desert Center	Metropolitan Water District of Southern California (MWD)	Existing	144-foot pumping plant that is part of MWD's facilities	44.15	Point
Recreational Opportunities	Eastern Riverside County	BLM	Existing	BLM has numerous recreational opportunities on lands in eastern Riverside County along the I-10 corridor, including the Corn Spring's Campground, Wiley's Well Campground, Coon Hollow Campground, and Midland Long-Term Visitor Area	14.53	Point

Project Name	Location	Ownership	Status	Project Description	Approximate Distance From Project Site (Miles)	Feature
Kaiser Mine	Eagle Mountain, north of Desert Center	Kaiser Ventures, Inc	Existing	Kaiser Street 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. Closed in 1980s	48.23	Point

Executive Summary Attachment A Table 2
Blythe Solar Power Project – Cumulative Impacts (Foreseeable Projects)

Project Name	Location	Ownership	Status	Project Description	Approximate Distance From Project Site (Miles)	Feature
Four Commercial Projects	Blythe	Various	Approved	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. Dates of construction unknown at this time	10.64	Point
Intake Shell	Blythe	Shell Oil	Under Construction	Reconstruction of a Shell facility located at Intake & Hobson Way	11.53	Point
Three Residential Developments	Blythe	Various	Under Construction	3 residential development projects are under construction: River Estates at Hidden Beaches, The Chanslor Place, Mesa Bluffs. 125 single-family homes are currently being built	10.03	Point
Twelve Residential Developments	Blythe	Various	Approved or under construction	12 residential development projects have been approved by the Blythe Planning Department: Vista Palo Verde, Van Weelden, Sonora South, Ranchette Estates, Irvine Assets, Chanslor Village, St. Joseph's Investments, Edgewater Lane, The Chanslor Place Phase IV, Cottonwood Meadows, Palo Verde Oasis. A total of 1,005 single-family residences are proposed	10.08	Point
Devers-Palo Verde No. 2 (DPV2) Trans-mission Line Project	From the Midpoint Substation to Devers Substation	SCE	California Public Utility Commission (CPUC) approved petition to modify request to construct CA-only portion, 11/2009	New 500-kV transmission line parallel to the existing DPV1 from the new SCE Colorado River Substation, approximately 10 miles southeast 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	26.77	Line

Project Name	Location	Ownership	Status	Project Description	Approximate Distance From Project Site (Miles)	Feature
Desert Southwest Transmission Line	118 miles in length, primarily parallel to DPV	Imperial Irrigation District	Approved	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	27.64	Line
Eagle Mountain Pumped Storage Project	Eagle Mountain iron ore mine, north of Desert Center	Eagle Crest Energy	Federal Energy Regulatory Commission (FERC) draft EIS published in 12/2010	1,300-MW pumped storage energy-generation project on 2,200 acres of public and private land, designed to store off-peak energy to use during peak hours	44.15	Polygon
Desert Center 50	Desert Center	US Solar Holdings	Under review	A planned 49.5-MW fixed, flat-panel solar PV project	37.39	?
Blythe Mesa Solar I	Blythe	Renewable Resources Group	Under review	A planned 485-MW solar PV project on private land in Blythe	7.56	Point
Blythe Solar Power Generation Station 1	Blythe	South-western Solar Power	Approved	A planned 4.76-MW solar PV project, including 69 PV panels that stand 50 feet tall and 72 feet wide	6.55	Point
Eagle Mountain Landfill Project	Eagle Mountain, North of Desert Center	Mine Reclamation Corporation and Kaiser Eagle Mountain	Court of Appeals	Project proposed for a 4,000acre portion of the Kaiser Eagle Mountain Mine in Riverside County	42.47	Point
Wiley's Well Communication Tower	East of Wiley's Well Road just south of I-10	Riverside County	Final EIR	Approximately 20 communication sites to provide voice and data transmission for Riverside County's fire and law enforcement agencies	9.64	Point
Eagle Mountain Wind Project Met Towers	South of Eagle Mountain, north of Joshua Tree National Park	LH Renewable	Wind testing pending	Meteorological towers for wind testing	39.49	?

Project Name	Location	Ownership	Status	Project Description	Approximate Distance From Project Site (Miles)	Feature
Green Energy Express Transmission Line Project	Eagle Mountain Substation to Southern California	Green Energy Express	Approved	70-mile, double-circuit, 500kV transmission line from Eagle Mt. Substation to Southern California	29.54	Line

Executive Summary Attachment A Table 3
Blythe Solar Power Project – Cumulative Impacts (Foreseeable Projects within the California Desert)

Project Name	Location	Ownership	Status	Project Description	Approximate Distance From Project Site (Miles)	Features
Blythe Energy Project II	Near Blythe Airport	Blythe Energy	Approved	520-MW, combined-cycle power plant, on 30 acres within the Blythe Energy Project's 76-acre site	5.73	Polygon
Palen Solar Power Project	10 miles east of Desert Center	Bright Source, Inc	Petition to Amend under Review at CEC	Two adjacent solar fields of 250 MW each are proposed for combined nominal output of approximately 500 MW. Each of the 250 MW solar fields will have a dedicated SRGS/Tower, solar field/heliostat array of approximately 170,000 heliostats, and a dedicated non-reheat Rankine-cycle steam turbine generator/power block.	27.80	Polygon
NextEra/ Florida Power & Light (FPL) McCoy	13 miles northwest of Blythe	McCoy Solar	FEIS completed; ROD issued March 2013; project waiting for ROW	Up to 750-MW solar PV project on 7,700 acres of BLM land and 470 acres of private land, with a 16-mile gen-tie	3.02	Polygon
McCoy Soleil Project	10 miles northwest of Blythe	EnXco	Plan of Develop-ment (POD) submitted to Palm Springs BLM	300-MW solar power tower project located on 1,959 acres; Requires a 14-mile transmission line to the proposed SCE Colorado River Substation south of I-10	5.56	Polygon
Genesis Solar Energy Project	North of I-10, 25 miles west of Blythe, 27 miles east of Desert Center	NextEra (FPL)	Approved, under construction	250-MW solar power project on 1,950 acres north of Ford Dry Lake, with 6-mile natural gas pipeline and 5.5-mile gen-tie line to the Blythe Energy Center-Julian Hinds transmission line	13.97	Polygon

Project Name	Location	Ownership	Status	Project Description	Approximate Distance From Project Site (Miles)	Features
Rice Solar Energy Project	Rice Valley, Eastern Riverside County	Rice Solar Energy	Approved, construction date unknown at this time	150-MW solar power tower project with liquid salt storage; located on 1,410 acres; includes a 650 foot-tall power tower, an approximately 10-mile-long interconnection tie-line to the Western Parker-Blythe transmission line	27.23	Polygon
Blythe Airport Solar I Project	Blythe Airport	Riverside County	Approved	100-MW solar PV project on 640 acres of Blythe airport land	3.22	Polygon
Desert Quartzite	South of I-10, 8 miles southwest of Blythe	First Solar	Plan of Develop-ment submitted to BLM	600-MW solar PV project on 7,724 acres, adjacent to DPV1 transmission line and SCE Colorado River Substation	7.49	Polygon
Desert Sunlight Project	6 miles north of Desert Center	First Solar (GE, Sumitomo Corp and NextEra)	Approved	550-MW solar PV project on 4,144 acres of BLM land, requiring a 12-mile transmission line to the planned Red Bluff Substation. Construction has begun on this project.	38.54	Polygon
Eagle Mountain Wind Project Met Towers	South of Eagle Mountain, north of Joshua Tree National Park	LH Renewable	Wind testing pending	Meteorological towers for wind testing	39.49	Point
EnXco	North of Wiley's Well Rd, east of Genesis Solar Energy Project	EnXco	POD submitted to BLM	300-MW solar PV project	10.28	Polygon
Desert Lily Soleil Project	6 miles north of Desert Center	EnXco	POD submitted to BLM	100-MW solar PV project on 1,216 acres of BLM land	32.15	Polygon
Big Maria Vista Solar Project	North of I-10, 12 miles nw Blythe	Bullfrog Green Energy	POD submitted to BLM	500-MW solar PV project on 2,684 acres	9.70	Polygon
Chuckwalla Solar I	1 mile north of Desert Center	Chuckwalla Solar I	POD submitted to BLM	200-MW solar PV project on 4,083 acres	33.15	Polygon

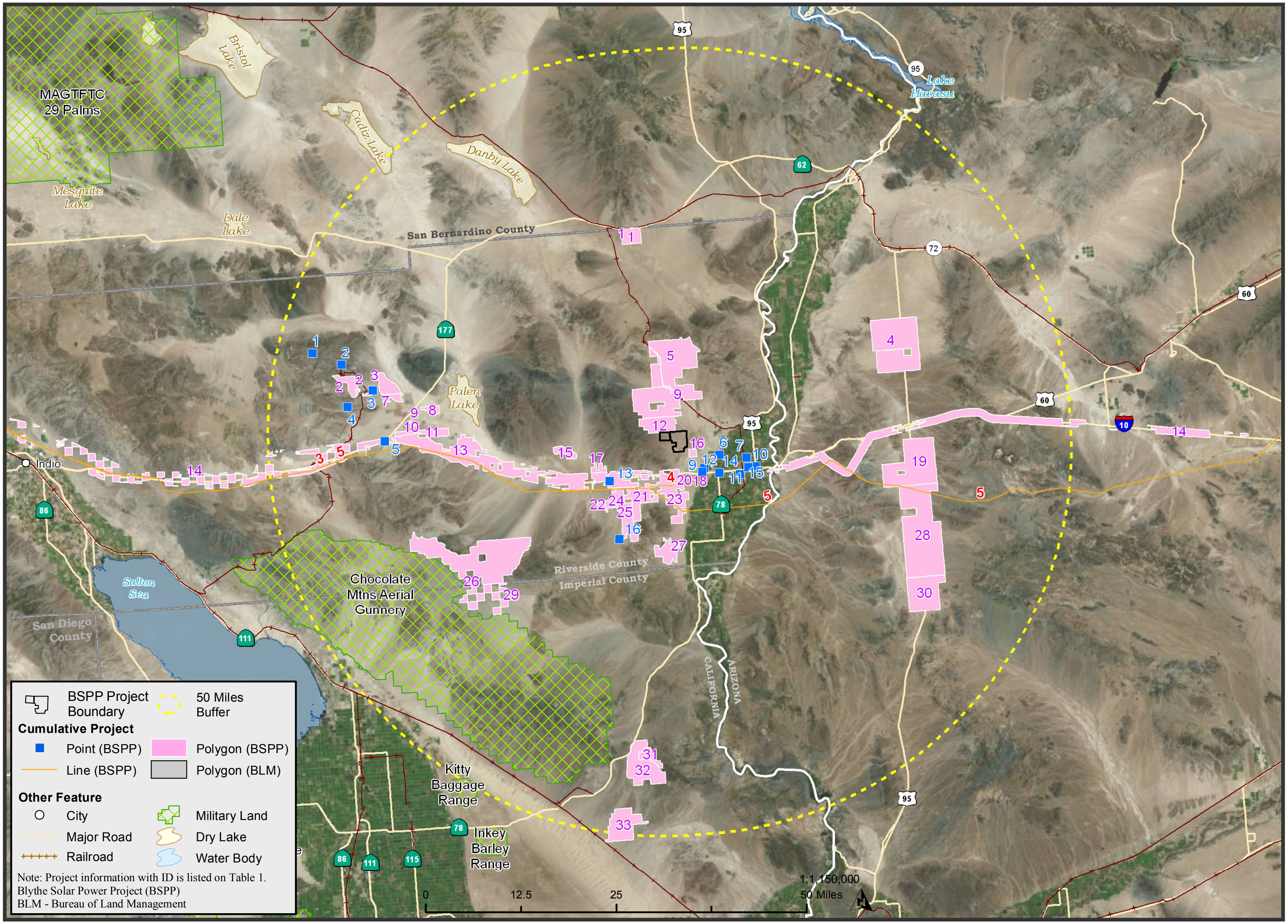
Project Name	Location	Ownership	Status	Project Description	Approximate Distance From Project Site (Miles)	Features
Mule Mountain Solar Project	South of I-10, 4 miles west of Blythe	Bullfrog Green Energy	POD submitted to BLM	500-MW solar PV project on 2,684 acres	11.08	Polygon
Quartzsite Solar Energy	10 miles north of Quartzsite	Solar Reserve	Draft EIS released	100-MW, 653-foot-tall power tower on 1,500 acres of BLM land	31.22	Polygon
Desert Harvest	6 miles north of Desert Center	EnXco	DEIS published	100-MW solar PV project on 930 acres	37.28	Polygon
Keim Substation	Approximately 4.5 miles west of Blythe	Unknown	Proposed	Substation/Switching Station	5.49	Point

Executive Summary Attachment A Table 4
Blythe Solar Power Project – Cumulative Impacts (Projects on Hold)

Project Name	Location	Ownership	Status	Project Description	Approximate Distance From Project Site (Miles)	Feature
Ogilby Solar	Chocolate Mountain	Pacific Solar Investments	Revised POD 8/26/11	1,500-MW Solar Thermal Trough	50.51	Polygon
Mule Mountain III	Chuckwalla Valley	Enxco	Pending	200-MW Solar PV	11.08	Polygon
La Posa Solar Thermal	Stone Cabin, AZ	Pacific Solar Investments	Pending	2,000-MW Solar	34.78	Polygon
Nextlight Quartzsite	Quartzsite, AZ	Nextlight Renewable Power	Pending	50-MW concentrated solar power plant, trough	31.70	Polygon
Ogilby Solar	Chocolate Mountain	Pacific Solar Investments	Revised POD 8/26/11	1,500-MW Solar Thermal Trough	50.51	Polygon
Mule Mountain III	Chuckwalla Valley	Enxco	Pending	200-MW Solar PV	11.08	Polygon
La Posa Solar Thermal	Stone Cabin, AZ	Pacific Solar Investments	Pending	2,000-MW Solar	34.78	Polygon
Ogilby Solar	Chocolate Mountain	Pacific Solar Investments	Revised POD 8/26/11	1,500-MW Solar Thermal Trough	50.51	Polygon
Milpitas Wash	Chuckwalla Valley	John Deere Renewables	Authorized	Unknown	31.40	Polygon
Graham Pass Wind Project	Riverside County	Graham Pass, Inc	Pending	175-MW Wind Project	29.49	Polygon
Palo Verde Mesa Solar Project	Northwest of Blythe	Renewable Resources Group	(NOP) Filed	486-MW Solar	14.51	Polygon
Sonoran West	Riverside County	BrightSource	Pending	540-MW Solar	8.61	Polygon
Blythe PV Project	Blythe	First Solar	Existing	21-MW solar photovoltaic (PV) project on 200 acres	27.82	Polygon

EXECUTIVE SUMMARY - FIGURE 1

Blythe Solar Power Project - Cumulative Impacts



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Microsoft Bing Aerial, OpenStreetMap - May 2013, Bureau of Land Management - May 2013

Executive Summary Figure 1A
Blythe Solar Power Project – Cumulative Impacts (Projects within the map view)

POINT

LABEL ID	OID	PROJECT NAME	DISTANCE (MILES)	Status*
1	34	Kaiser Mine	48.80	E
2	20	Eagle Mountain Pumped Storage Project	44.73	F
3	22	Eagle Mountain Wind Project Met Towers	40.09	F
4	19	Eagle Mountain Landfill Project	43.07	F
5	64	Desert Center 50	38.02	F
6	8	Blythe Solar Power Generation Station I	5.99	F
7	58	Twelve Residential Developments	9.51	F
8	4	Blythe Energy Project	5.25	E

LABEL ID	OID	PROJECT NAME	DISTANCE (MILES)	Status*
9	31	Intake Shell	10.98	F
10	24	Four Commercial Projects	10.10	F
11	35	Keim Substation	5.49	F
12	61	Wiley's Well Communication Tower	10.24	F
13	7	Blythe Mesa Solar I	7.14	F
14	57	Three Residential Developments	9.54	F
15	52	Recreational Opportunities	14.95	E

LINE

LABEL ID	OID	PROJECT NAME	DISTANCE (MILES)	Status*
1	28	Green Energy Express Transmission Line	5.98	F
2	16	Desert Southwest Transmission Line	3.68	F

LABEL ID	OID	PROJECT NAME	DISTANCE (MILES)	Status*
3	18	Devers-Palo Verde #2 (DPV2) Transmission Line	5.69	F

POLYGON

LABEL ID	OID	PROJECT NAME	DISTANCE (MILES)	Status*
1	53	Rice Solar Energy Project	27.23	F
2	47	LH Renewables Riverside County Type II	43.30	P
3	17	Desert Sunlight Project	38.54	A
4	51	Quartzsite Solar Energy	31.22	F
5	2	Big Maria Vista Solar Project	9.70	F
6	21	Eagle Mountain Pumping Plant	41.36	F
7	13	Desert Harvest	37.28	F
8	14	Desert Lily soleil Project	32.15	F
9	38	McCoy Soleil Project	5.56	F
10	12	Desert Center 50	34.45	F

LABEL ID	OID	PROJECT NAME	DISTANCE (MILES)	Status*
11	9	Chuckwalla Solar I	33.15	F
12	43	NextEra McCoy	3.02	F
13	49	Palen Solar Power Project	27.03	F
14	59	West-wide Section 368 Energy Corridors	11.16	E
15	25	Genesis Solar Energy Project	14.61	F
16	3	Blythe Airport Solar I Project	2.78	F
17	23	EnXco	10.91	F
18	5	Blythe Energy Project, Phase II	5.37	F
19	44	Nextlight Quartzsite	31.09	P
20	63	Blythe PV Project	5.67	E

POLYGON									
LABEL ID	OID	PROJECT NAME	DISTANCE (MILES)	Status*	LABEL ID	OID	PROJECT NAME	DISTANCE (MILES)	Status*
21	65	Sonoran West	9.06	P	28	36	La Posa Solar Thermal	34.24	P
22	33	Ironwood State Prison	12.94	E	29	39	Milpitas Wash	31.97	P
23	14	Desert Quartzite	7.63	F	30	60	Wildcat Quartzsite	38.04	P
24	10	Chuckwalla Valley State Prison	12.02	E	31	30	Imperial Wind	41.46	P
25	41	Mule Mountain III	11.54	P	32	48	Oro Valley Wind	42.86	P
26	27	Graham Pass Wind Project	30.10	P	33	47	Ogilby Solar	50.73	P
27	50	Palo Verde Mesa Solar Project	14.68	P					

*Status of project is “existing (E)”, “Pending (P)”, “Foreseeable (F)”, OR “Authorized (A)”.

Note:

1. The distances from all the cumulative projects are calculated to the centroid of Blythe Solar Power Project.
2. The distances between the line features of the cumulative projects are calculated by the shortest distance between the Blythe solar Power Project centroid to the line features segments.
3. The distancesbetween the polygon features of the cumulative projects are calculated between the Blythe Solar Power Project centroid to the centroids of all the polygon features.

All distances are estimated.

INTRODUCTION

Testimony of Mary Dyas

BACKGROUND

On April 12, 2013, NextEra Blythe Solar Energy Center, L.L.C. (NextEra Blythe Solar) filed a revised petition requesting to modify the Blythe Solar Power Project (BSPP) Final Decision. The project was licensed by the Energy Commission on September 15, 2010, as a 1,000-megawatt (MW) solar thermal power-generating facility utilizing parabolic trough technology on approximately 7,043 acres. The project site is located approximately 8 miles west of the City of Blythe and 2 miles north of the Interstate-10 freeway, on land managed by the Bureau of Land Management (BLM) in Riverside County, California.

The Final Decision allowed the BSPP to be constructed in phases. The BLM published the Plan Amendment/Record of Decision (PA/ROD) on October 22, 2010, and issued the Right-of-Way Grant (ROW No. CACA-048811) on November 4, 2010. On November 4, 2010, the original project owner, Palo Verde Solar I, LLC. (PVSI), obtained a Notice to Proceed from the Energy Commission Compliance Project Manager for construction of Phase 1A of the BSPP and immediately began construction.

PVSI continued construction of portions of Phase 1A until August, 2011. In a letter dated August 25, 2011, PVSI advised the Energy Commission and the BLM that it would cease construction activities on the BSPP site and would seek to amend the Final Decision and the ROW Grant to allow construction and operation of photovoltaic (PV) technology on the site. This letter outlined maintenance activities that would continue on the site to ensure site security and prevent off-site environmental impacts. The Energy Commission and the BLM approved a maintenance plan and associated activities on September 8, 2011.

On October 4, 2011, the Governor signed into law SB 226 (Chapter 469, Statutes of 2011). SB 226 added Section 25500.1 to the Public Resources Code, authorizing the Energy Commission to review amendments converting certain previously Commission-certified solar thermal power plants, including the BSPP facility, into PV power plants.

On June 14, 2011, PVSI filed a petition with the Energy Commission requesting to modify the BSPP Final Decision by replacing the solar thermal trough technology with PV solar technology. On July 11, 2012, the Energy Commission approved a change in ownership of the BSPP from PVSI to NextEra Blythe Solar. In September 2012, NextEra Blythe Solar received Energy Commission and BLM approval of a revised maintenance plan, and in December 2012, NextEra Blythe Solar completed a key component of that plan, which involved dismantling several miles of desert tortoise/silt fencing.

The modifications proposed in the April 2013 revised petition to amend would reduce the physical size of the BSPP and the amount of electricity generated. The modified project would be located entirely on 4,070 acres of publicly-owned land managed by BLM. Including the permanently disturbed area (69.4 acres) of the linear facilities outside of the proposed solar plant site, the total acreage would be 4,139 acres. This is approximately 2,904 acres less than the original approved 7,043 acres (**Project Description Figure 1**). Linear access to the site would be the same as for the original approved project, and the BSPP would continue to interconnect to the regional transmission grid via the same gen-tie line route to Southern California Edison's Colorado River Substation, which is currently under construction.

NextEra Blythe Solar proposes to develop the BSPP in four phases (units) designed to generate a total of approximately 485 MW (nominal) of electricity when completed (**Project Description Figure 2**). NextEra Blythe Solar has not selected the specific PV modules nor has it decided on whether a tracker system, fixed-tilt system, or a combination of the two systems would be installed. NextEra Blythe Solar is requesting that the Final Decision be amended to allow the specific combination of PV technologies to be selected prior to construction without the need for filing another amendment. All four units would share an operations and maintenance facility, one on-site switchyard, access and maintenance roads, perimeter fencing and other ancillary security facilities, and a 230-kV gen-tie line.

AMENDMENT PROCESS

Section 25500.1 of the Public Resources Code authorizes the Energy Commission to review proposed amendments to convert solar thermal power plants to the use of PV technology. Section 25500.1 only applies to projects, such as BSPP, that meet certain requirements. Section 25500.1(d), requires the Commission to utilize its amendment process under section 1769 of Title 20 of the California Code of Regulations.

Staff has reviewed the April 12, 2013 NextEra Blythe Solar Petition to Amend and has determined that the proposed modifications to the project may have a significant effect on the environment and would result in a change to conditions of certification adopted by the Final Decision. Because of that determination, the petition must be processed as amendment to the Final Decision. The Commission further determined that the BSPP petition would be heard by a Commission-appointed committee consisting of two commissioners.

PURPOSE OF THIS REPORT

This Staff Assessment (SA) is the Energy Commission staff's independent analysis of the petition to amend the BSPP. It is neither a committee document, nor a draft Commission Decision. The SA describes the following:

- the proposed modified project;
- the updated existing environmental setting from the Final Staff Assessment of the original Energy Commission review;
- whether the modified facilities can be constructed and operated safely and reliably in conformance with applicable laws, ordinances, regulations, and standards (LORS);

- the environmental consequences of the modified project, in conjunction with other existing and known planned developments;
- the potential cumulative impacts of the modified project, in conjunction with other existing and known planned developments;
- modified and/or new conditions of certification proposed by the project owner, staff, interested agencies, local organizations, tribes, and intervenors that may lessen or eliminate potential impacts of the BSPP;
- modified and/or new conditions of certification under which the project should be constructed and operated, if the modified project is certified; and,
- project alternatives.

The analyses contained in this SA are based upon information from the: 1) Petition to Amend provided by the project owner; 2) responses to Energy Commission staff data requests; 3) supplementary information from local, state, and federal agencies, interested organizations and individuals, 4) existing documents and publications, including the record from the approved BSPP; 5) independent research; and 6) other docketed communications. The analyses for most technical areas include discussions of proposed modified and new conditions of certification. Each condition of certification is followed by a proposed means of “verification.” All changes to conditions of certification in the original Final Decision are shown in this document so the reader can easily identify the changes being made. Deleted text in the conditions of certification is shown as ~~strikethrough;~~ new text is **bold** and **underlined**.

This SA is intended to be a complete review of the modified project and in many cases relies on analysis that was prepared for the original BSPP. This information has been reviewed and updated to reflect current conditions and the setting that exists today. Although this document provides a full analysis of the project as a whole, this petition is being processed as an amendment to the BSPP Final Decision. Thus a Decision will only be made by the Energy Commission on the proposed changes to the existing BSPP certification.The SA serves as staff’s testimony in evidentiary hearings to be held by the BSPP Committee who oversee this case. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, the applicant, intervenors, governmental agencies, tribes, and the public prior to proposing its recommended decision to the full Commission. The Committee will provide a 30-day public comment period on the Presiding Member’s Proposed Decision (PMPD). The Energy Commissioner will make a final decision on BSPP, including findings, after the Committee’s publication of thePMPD .

ORGANIZATION OF THE STAFF ASSESSMENT

The sections in this SA include an Executive Summary, Introduction, Project Description, and a Project Analysis. The Project Analysis contains an Environmental Assessment, Engineering Assessment, Alternatives and General Conditions. The Environmental Assessment contains the following chapters: 1) Air Quality; 2) Biological Resources (to be provided in Part B of this SA); 3) Cultural Resources (to be provided in Part B of this SA); 4) Hazardous Materials Management; 5) Land Use (to be provided in

Part B of this SA); 6) Noise and Vibration; 7) Public Health; 8) Socioeconomics; 9) Soil and Water Resources; 10) Traffic and Transportation (to be provided in Part B of this SA); 11) Transmission Line Safety and Nuisance; 12) Visual Resources (to be provided in Part B of this SA); 13) Waste Management; and 14) Worker Safety and Fire Protection. The Engineering Assessment contains the following sections: 15) Facility Design; 16) Geology and Paleontology; 17) Power Plant Efficiency; 18) Power Plant Reliability; and 19) Transmission System Engineering. The Environmental Assessment, Engineering Assessment and General Conditions are followed by a discussion of facility closure, project construction, and operation compliance monitoring plans and a list of the staff that prepared this report.

All of the sections under the Environmental Assessment and Engineering Assessment include a discussion of: laws, ordinances, regulations and standards (LORS); the regional and site-specific setting; the modified project direct and cumulative impacts; proposed mitigation measures; conclusions and recommendations; and modified and/or new conditions of certification for both construction and operation (if applicable).

Part B of the SA is anticipated to be published the week of September 30th.

AGENCY AUTHORITIES AND RESPONSIBILITIES

The Energy Commission has the exclusive authority to certify and monitor the construction, modification, and operation of thermal electric power plants having an output of 50 megawatts (MW) or larger within California. 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).

Section 25500.1 of the Public Resources Code authorizes the Energy Commission to review amendments to convert proposed solar thermal power plants, approved by the Energy Commission, and which is on federal land, to the use of photovoltaic (PV) technology. Section 25500.1 only applies to projects such as BSPP that meet certain requirements. Section 25500.1(d), requires the Commission to utilize its amendment process under Section 1769 of Title 20 of the California Code of Regulations.

The Energy Commission must evaluate the impacts caused by the proposed changes to the approved BSPP project and will determine if the modified BSPP would remain in compliance with applicable LORS (20 Cal. Code Regs., § 1769). 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 amendment process.

U.S. BUREAU OF LAND MANAGEMENT

The approved BSPP site is located entirely on land managed by the BLM. During the original BSPP proceeding in 2009 and 2010, Energy Commission staff and BLM staff worked closely together on the review and analysis of the project.

During the original licensing case, the Energy Commission and BLM issued separate final documents for compliance with CEQA and NEPA, respectively. The Energy Commission approved the original project on September 15, 2010. The BLM published the Plan Amendment/Record of Decision (PA/ROD) on October 22, 2010, and issued the ROW Grant on November 4, 2010. For the modified BSPP to be constructed, a revised ROW grant from BLM would be required, in addition to the amended certification from the Energy Commission.

On March 18, 2013, NextEra Blythe Solar submitted to the BLM a supplement to the Plan of Development (POD) that reflects the proposed conversion of the project from thermal solar to PV. On August 30, 2013, BLM published a *Notice of Intent to Prepare an Environmental Impact Statement for the Blythe Solar Power Project* in the Federal Register (Vol. 78, No. 169) to start the National Environmental Policy Act (NEPA) process for an Environmental Impact Statement (EIS) to evaluate the change in technology for this project. A scoping meeting for the modified BSPP was held on Tuesday, September 17, 2013 in Blythe, CA.

The Energy Commission and BLM continue to share staff expertise, information, and documentation to promote intergovernmental coordination at the local, state, and federal levels. Energy Commission staff will continue to work cooperatively with BLM staff to review the modified BSPP, and ultimately the Energy Commission and BLM will issue separate final decisions.

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.] and the Migratory Bird Treaty Act [16 U.S.C. §§ 703-712]. 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 lead federal agency—BLM—to initiate formal consultation and the submittal of a Biological Assessment (BA) that determines that the proposed project is likely to adversely affect a listed species. The BA will be submitted by NextEra in conjunction with the draft EIS being published in October 2013. The BLM has already received a Biological Opinion (BO) for the original BSPP project. Following review of the BA, the USFWS is expected to amend the BO for the modified project, which will revise the take statements as needed (habitat acres impacted and possibly desert tortoise relocation numbers) and specify any other reasonable and prudent measures that must be implemented for the desert tortoise. The BLM will not issue a ROD until the final BO is issued; and therefore, the project owner may begin work on the site only after the BO is issued. Permit issuance may occur after the final Energy Commission Decision is released, however, all terms and conditions of the BO are to be incorporated by the project owner, pursuant to Condition of Certification BIO-7.

THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

The California Department of Fish and Wildlife (CDFW) has the authority to protect water resources through regulation of modifications to streambeds, under section 1602 of the Fish and Game Code. The BLM, Energy Commission, and NextEra Blythe Solar have provided information to the CDFW to assist in their determination of the impacts to streambeds and identification of permit and mitigation requirements. The CDFW also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act, such as the desert tortoise. An amendment to the Commission's Final Decision would also amend the Incidental Take Permit and the Lake and Streambed Alteration Agreement from the CDFW. In November 2010, PVSI submitted a Notification of Lake or Streambed Alteration for the BSPP to the CDFW. Additionally, the BSPP obtained a Jurisdictional Determination from the United States Army Corps of Engineers that there are no waters of the United States on the BSPP site. Additionally, the BSPP obtained a Jurisdictional Determination from the United States Army Corps of Engineers that there are no waters of the United States on the BSPP site.

CDFW also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act (CESA) [Fish and Game Code Sections 2050-2116]. The Energy Commission certification is in-lieu of streambed alteration agreement and incidental take permits for state-listed species usually granted by CDFW.

NATIVE AMERICAN TRIBES

Tribes were invited to participate in the review of the project, based upon a list of affiliated tribes, organizations, and an individual provided by the Native American Heritage Commission (NAHC) and the BLM.

In response to the BSPP amendment, on July 24, 2013, staff sent letters to all of the NAHC and BLM listed tribal entities, consisting of fifteen tribes, one tribal foundation and one tribal individual, inviting them to learn more about the project as proposed for amendment and encouraging tribes to provide additional cultural resources information to staff. On August 2nd and August 5th, 2013, staff made attempts to contact via phone and email, all of the tribes that had received July 24, 2013 letters. During these communication attempts staff left messages informing tribal staff that Energy Commission staff would be in the project vicinity during the week of August 12, 2013, and was available for office or project vicinity meetings. A number of responses were received from some of the tribes on the contact list. These responses will be discussed in the Cultural Resources section in Part B of the Staff Assessment.

ENERGY COMMISSION'S PUBLIC ADVISER'S OFFICE

The Public Adviser advises the public on how to participate in the Energy Commission process, but does not represent members of the public. A representative of the Public Adviser's Office will attend and present information at a workshop on this Staff Assessment in the near future.

COMMENTS

Responses to written comments received during the amendment process are included in the SA in the technical sections to which they apply. Below is a table summarizing the comments that have been received to date.

Table 1 Agency, Intervenor, and Public Comments for BSPP

Blythe Solar Power Project 09-AFC-6C

DATE	DOCUMENT	Air Quality	Alternatives	Biological Resources	Cultural Resources	Efficiency	Facility Design	Funding/Cost	General Opposition	Geological Hazards	Hazardous Materials	Land Use	Noise	Paleontological Resources	Project Overview	Public Health	Reliability	Socioeconomics	Soils	Suggestions/Requests	Support of the Project	Traffic and Transportation	Trans Line Safety & Nuisance	Transmission System Design	Visual Resources	Waste Management	Water Resources	Worker Safety & Fire Protection
07/10/2012	County of Riverside's Comment Letter								X																			
08/07/2012	Daniel Rivest re CdTe																									X		
09/25/2012	Daniel Rivest re CdTe																									X		
04/11/2013	Soboba Band of Luiseno Indians Response to Cultural Resources Letter of Requests				X																							
08/05/2013	Chemehuevi Indian Tribe Response to Cultural Resources Letter of Requests				X																							
08/27/2013	Lin Porter re Transmission Line EMF																						X					

REFERENCES

CARB 2011a—California Air Resources Board. Ambient Air Quality Standards. Area Designations. http://www.arb.ca.gov/desig/desig.htm June 2011.

CEC 2010a—California Energy Commission (TN 55836). Staff Assessment/Draft Environmental Impact Statement for Blythe Solar Power Project. March 11, 2010.

CEC 2010b—California Energy Commission (TN 56992). Blythe Solar Power Project (09-AFC-6): Revised Staff Assessment. June 4, 2010.

CEC 2010c—California Energy Commission (TN 57475). Supplemental Staff Assessment of Blythe Solar Power Project (09-AFC-6). July 7, 2010.

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MDAQMD2010a—Mojave Desert Air Quality Management District (TN 57554). Final Determination of Compliance. Dated July 8, 2010. Submitted to Energy Commission on July 13, 2010.

NEBS2013a—NextEra Blythe Solar Energy Center, L.L.C. (TN 70318). Revised Petition to Amend (Conversion to PV). Dated April 12, 2013. Submitted to Energy Commission on April 12, 2013.

NEBC2013c—NextEra Blythe Solar Energy Center, L.L.C. (TN 70465). Errata to Air Quality for the Revised Petition to Amend. Dated April 25, 2013. Submitted to Energy Commission on April 25, 2013.

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NEBC2013e—NextEra Blythe Solar Energy Center, L.L.C. (TN 71305). Nextera Blythe Solar Energy Center L.L.C.'s Response to CEC Staff Data Request Set 1 (1-19). Dated June 17, 2013. Docketed June 17, 2013.

NEBC2013f—NextEra Blythe Solar Energy Center, L.L.C. (TN 71500). Addendum I, Cultural Resources Class III Report for the Proposed Blythe Solar Power Project. Dated July, 2010.

NEBC2013g—NextEra Blythe Solar Energy Center, L.L.C. (TN 71501). Blythe Solar Power Project Letter Report: Transmission Line Reroute. Dated July, 2010.

NEBC2013h—NextEra Blythe Solar Energy Center, L.L.C. (TN 71634). Addendum I, Cultural Resources Class III Report, Attachments 4, 5, and 6 for the Proposed Blythe Solar Power Project. Dated July, 2010.

PVSI2009a—Palo Verde Solar I, L.L.C. (TN 52937). Blythe Solar Power Project Application for Certification Volumes 1 & 2. Submitted to the Energy Commission on August 24, 2009.

PVSI 2011a—Palo Verde Solar I, L.L.C. (TN 61148). Blythe Solar Power Project Petition to Amend: Facility Design and Transmission Line Location. Dated June, 2011. Submitted to Energy Commission on June 14, 2011.

PVSI 2012a—Palo Verde Solar I, L.L.C. (TN 66026). Palo Verde Solar I, L.L.C., Petition for Amendment (Conversion to PV). Dated June 28, 2012. Submitted to Energy Commission on June 28, 2012.

PVSI2012b—Palo Verde Solar I, L.L.C. (TN 66027). Palo Verde Solar I, L.L.C., Petition for Amendment: Air Quality Modeling Files. Dated June 28, 2012. Submitted to Energy Commission on June 28, 2012.

PROJECT DESCRIPTION

Testimony of Mary Dyas

PROJECT LOCATION

The Blythe Solar Power Plant (BSPP) would be located approximately 8 miles west of the City of Blythe and 2 miles north of the Interstate-10 freeway, on land managed by the Bureau of Land Management (BLM) in Riverside County, California.

PROJECT DESCRIPTION

BLYTHE SOLAR POWER PROJECT APPROVED BY THE ENERGY COMMISSION ON SEPTEMBER 15, 2010

The approved BSPP was to consist of four adjacent, independent, and identical units of 250-megawatt (MW) nominal capacity each for a total nominal capacity of 1,000 MW. The proposed total acreage for the site was approximately 7,043 acres of BLM-managed land, including linear facilities. The project was to utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors would 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) would be brought to high temperature (750°F) as it circulated through the receiver tubes. The HTF would then be piped through a series of heat exchangers where it would release its stored heat to generate high pressure steam. The steam would then be fed to a traditional steam turbine generator where electricity would be produced. Dry-cooling technology would have been used. Individual components of the approved project included:

- Solar Field and Power Block #1 (northeast);
- Solar Field and Power Block #2 (northwest);
- Solar Field and Power Block #3 (southwest);
- Solar Field and Power Block #4 (southeast);
- Access road to on-site office from and upgrades to a portion of Black Rock Road;
- Warehouse/maintenance building, assembly hall, and laydown area;
- Telecommunications lines;
- Natural gas pipeline;
- Concrete batch plant;
- Fuel depot;
- On-site transmission facilities, including central internal switchyard;

- 230 kilovolt (kV), double-circuit gen-tie line interconnecting to the Colorado River Substation;
- Groundwater wells used for water supply; and
- Distribution/construction power line.

During the Energy Commission’s certification process, Visual Resources staff concluded that the BSPP, as originally proposed, would have significant visual impacts that could not be mitigated to less than significant levels. Additionally, Land Use staff determined that cumulative impacts from conversion of open space could not be mitigated. The conditions of certification assured that the project’s direct, indirect, and cumulative adverse environmental impacts would be mitigated to the extent feasible. Where adequate mitigation was not feasible, overriding considerations warranted acceptance of the unmitigable impacts. In the final decision it was determined that the BSPP was required for public convenience and necessity, and there were not more prudent and feasible means of achieving such public convenience and necessity. Also, the benefits of the BSPP outweighed any direct, indirect, or cumulative adverse impacts which might result from its construction or operation. The evidence of record established that no feasible site or generation technology alternatives to the project, as described during the certification proceedings, existed that would reduce or eliminate any significant environmental impacts of the mitigated project.

SUMMARY OF PROPOSED PROJECT MODIFICATIONS

The modified BSPP includes replacing the solar thermal technology completely with photovoltaic (PV) generating technology and reducing the physical size of the project. Linear access to the site would be the same as that of the approved BSPP, and the modified BSPP would continue to interconnect to the regional transmission grid via the same proposed gen-tie line to Southern California Edison’s (SCE’s) Colorado River Substation (CRS), which is currently under construction.

NextEra Blythe Solar Energy Center, L.L.C. (NextEra Blythe Solar) proposes to develop the BSPP in four operational phases designed to generate a total of approximately 485 MW of electricity. The first three units (phases) would consist of approximately 125 MW of alternating current (AC) each. The fourth unit would generate approximately 110 MW of AC. The transmission corridor is located in the center of the site with the exact location to be determined during final design.

NextEra Blythe Solar has not selected the specific PV modules nor has it decided on whether a single-axis tracking modular system, a fixed-tilt system, or a combination of the two systems would be installed. While both systems are similar in how they generate and distribute electricity, the orientation and technique for collection of the sun’s energy are different. In this amendment, NextEra Blythe Solar is requesting the ability to select the specific combination of PV technologies prior to construction without the need for filing another amendment.

During operations, all four units would share an operations and maintenance facility, one on-site switchyard, access and maintenance roads (either dirt, gravel, or paved), perimeter fencing and other ancillary security facilities, and a 230-kV gen-tie line.

The modified BSPP would be located entirely on public land within BLM Right-of-Way Grant No. CACA–048811. The total proposed acreage for the solar plant site is approximately 4,070 acres, excluding linear facilities outside of the proposed solar plant site.

The primary modifications to the approved BSPP are as follows:

- The previously planned four power blocks (which each included a steam turbine, evaporation pond, auxiliary boiler, air-cooled condenser, and equipment) and structures have been eliminated.
- The Land Treatment Units for HTF have been eliminated.
- The HelioTrough energy collection systems and associated HTF piping systems have been eliminated and replaced with PV panels configured for either horizontal tracking or fixed-tilt operations.
- The substation has been replaced by a switchyard which is located near the center of the disturbance area.
- The large assembly hall has been eliminated.
- The concrete batch plant has been eliminated.
- The natural gas line has been eliminated.
- The water treatment system has been reduced in size to accommodate a reduction in water usage. Consequently, the associated waste quantities have been reduced, and the number of evaporation ponds has been reduced from eight ponds to two.
- The large drainage structures surrounding the site have been eliminated, although smaller drainage features may be required.
- The amount of mass grading has been greatly reduced.
- The footprint has been modified to allow transmission and access road corridors to accommodate the NextEra McCoy and the EDF Renewable Energy[1] projects, proposed for locations to the north of the BSPP.
- Water use during construction has been reduced from approximately 4,100 acre-feet (AF) to 700 to 1,200 AF.
- Water use during operations has been reduced from approximately 600 acre-feet per year (AFY) to between 30 and 40 AFY.

[1] EDF Renewable Energy is the U.S. subsidiary of EDF Energies Nouvelles. EDF Energies Nouvelles is the renewable energy arm of the EDF group, a world-wide electricity company.

The modified project would be located entirely on 4,070 acres of publicly-owned land managed by BLM. Including the permanently disturbed area (69.4 acres) of the linear facilities outside of the proposed solar plant site, the total acreage would be 4,139 acres. This is approximately 2,904 acres less than the original approved 7,043 acres.

Photovoltaic Modules

NextEra Blythe Solar is considering the installation of both polycrystalline silicon solar cells and cadmium telluride (CdTe) solar cells. CdTe solar panels use solar cells constructed in a thin semiconductor layer (also known as a “thin film”) to absorb and convert sunlight into electricity. If thin film CdTe panels are used, NextEra Blythe Solar would ensure that the vendor offers a PV module recycling program through which any module may be returned for recycling.

Single-Axis Tracking System

A single-axis tracking system optimizes production by rotating the panels to follow the path of the sun throughout the day. The central axis of the tracking structure is oriented north to south and is constructed to rotate the panels east to west while limiting self-shading between rows. The system utilizes a method called back-tracking that consists of rotating the panels back toward a more horizontal position to avoid shadowing between the adjacent panels in the early morning and late afternoon hours of operation.

Fixed-Tilt System

A fixed-tilt racking system utilizes a metal framework structure or support table to which the modules are attached. The PV panels are mounted on the rack in a permanent fixed position tilted towards the south at approximately 30 degrees to optimize production throughout the year without any mechanical movement. A fixed-tilt system can generally follow the slope of the terrain which simplifies grading requirements. The support posts may vary in height above the ground surface to accommodate the variations in terrain. The total height of the structure with panels would be approximately 9 feet depending on the racking system configuration and tilt angle selected.

System Foundations

Both single-axis tracking and fixed-tilt mounting systems are supported by steel posts spaced approximately 10 feet apart. The support posts generally project 5 to 6 feet above the ground and are typically vibration driven to an approximate depth of 8 to 10 feet into the ground, depending on site geotechnical characteristics and tracking system design. Typical installations are constructed using steel piles or concrete foundations. Soil disturbance would be restricted to the pile insertion location, with temporary disturbance from the hydraulic ram machinery, which is about the size of a small tractor. Concrete foundations avoid ground penetration by withstanding the design loads from the weight of the concrete itself. Concrete requires time to cure and can be pre-cast and transported to the site or poured in place for installation. Concrete foundations reduce the ground penetration, but increase the permanent disturbance. All driven-post support structures are not considered permanent foundations, enabling complete removal when the BSPP is decommissioned.

Site Access

The modified project would utilize the same existing roads to reach the site as described in the Final Decision. Access to the BSPP would be via a new road (Dracker Drive) heading north from the frontage road (Black Rock Road). Dracker Drive would be accessed from a section of Black Rock Road, along I-10, from the plant access road to the Airport/Mesa Drive exit. The road would be paved from the entrance off of Black Rock Road north to the gates opening to Unit 1 and Unit 4.

Transmission System Interconnection

The gen-tie route remains largely unchanged from the approved project. It would proceed in a southerly direction, cross over I-10, and turn westward to the CRS, which is currently under construction. The metering point would be located in the switchyard on the BSPP site. The gen-tie line would be owned and operated by NextEra Blythe Solar.

Ancillary Facilities

Telecommunications Facilities

The modified project switchyard would require the same new telecommunication infrastructure as the originally approved project. The telecommunication facilities would be installed to provide a protective relay circuit and a SCADA (supervisory control and data acquisition) circuit together with data and telephone services. Voice and data communications for plant operations would be installed for use during construction and operations.

Operations and Maintenance Facility

The modified BSPP would likely include an approximately 3,000-square-foot Operations & Maintenance (O & M) building located near the center of the site and would be shared for services to all units. The building would provide an administration area, a work area for performing minor repairs, and a storage area for spare parts, transformer oil, and other incidental chemicals.

Meteorological Station

NextEra Blythe Solar would not modify its approved meteorological station.

Anemometers

Depending on the final design of the equipment, the modified BSPP's solar arrays may be installed with tracker anemometer towers, which measure and communicate wind speed data to the tracker controllers for solar array panel tracker positioning in the event of high winds. Each tower would measure approximately 30 feet in height, and would be installed within the arrays within the facility site.

Fencing and Site Security

For public safety and site security, the modified BSPP would have fencing around the site and access would be controlled via gates located at the entrances to the facility (at Units 1 and 4) consistent with the approved project. There would be a guard shack at the main facility gate during construction. A secondary access gate, similar in construction to the main gate, would be used for emergency purposes only. A fire department Knox Box or other access device and emergency contact placard would be provided at the main gate and secondary access gate to provide emergency access.

Fencing would be installed around the modified BSPP's solar plant site perimeter, substations, and around the evaporation pond described in accordance with the existing conditions of certification. Some modifications would be needed in areas of storm water inflow and outflow from the solar field to allow for high-flow events. Fencing would be designed to resist all wind or other loads imposed on the fence. Tortoise fencing would be installed 1 foot below the ground surface and 2 feet above the ground surface, using a fencing type recommended by the United States Fish and Wildlife Service (USFWS) and in accordance with the existing conditions of certification.

Temporary Construction Workspace, Yards, and Staging Areas

Temporary construction facilities for the modified BSPP would be built for materials storage, storage of equipment, for field fabrication facilities, and a construction office complex for employee work areas at the BSPP during construction, consistent with the approved project.

Distribution/Construction Power

The proposed SCE distribution line for the modified BSPP would provide construction power and electrical service to the O & M building, in the same manner as the approved project.

Fire Protection

Project-related fire-protection activities would be taken to limit personnel injury, property loss, and project downtime resulting from a fire.

During construction of the modified BSPP, a water truck or other portable, trailer-mounted water tank would be kept on-site and available to workers for use in extinguishing small man-made fires. Fire watches would be required during hot work on-site. An Emergency Action Plan (EAP) designating responsibilities and actions to be taken in the event of a fire or other emergency during construction would be provided to BLM and local fire departments for approval before the receipt of a Notice to Proceed.

During operation of the modified BSPP, fire protection systems for the solar plant site would include a fire protection water system for protection of the O & M building, including portable fire extinguishers and possibly hydrants. The fire protection water system would be supplied from an approximately 20,000-gallon raw and fire water storage tank located on the solar plant site near the O & M area.

Water Supply and Usage

The BSPP Final Decision allowed the construction of several wells to produce up to 600 AFY of water for operations and up to 4,100 AF for construction of the approved project. Up to three wells are anticipated for the modified project and would be constructed in the same manner as outlined in the Final Decision.

Construction-Related Water Needs

Construction-related water use would support site preparation and grading activities for the modified project. During earthwork for the grading of access roads, foundations, equipment pads, and other components, the primary uses of water would be for compaction and dust control. Smaller quantities would be required for preparation of the concrete required for building foundations and other minor uses. Subsequent to the earthwork activities, the primary water use would be for dust suppression.

Operation and Maintenance-Related Water Needs

BSPP well water quality is expected to be unsuitable for potable use without treatment since it contains between 730 and 3,100 milligrams per liter of total dissolved solids. Consequently, NextEra Blythe Solar is considering options for treatment of groundwater or the importation of trucked potable water to meet the modified project's potable water requirements for operation and maintenance.

Construction

The construction of the modified project would begin once all applicable approvals and permits have been obtained. After the preconstruction surveys, construction mobilization, and site preparation are completed, construction of the BSPP and gen-tie line would begin. Work would be completed in phased stages moving across the site so that completion of one phase is closely followed by the beginning of the next. Construction of all of the phases is anticipated to take approximately 48 months from the commencement of the construction process to completion of the BSPP and gen-tie line.

Construction Workforce Numbers

Typical construction work schedules are expected to be between 8 and 12 hours per day, Monday through Friday, from 7:00 a.m. to 10:00 p.m. The work schedule may be modified throughout the year to account for changing weather conditions (e.g., starting the workday earlier in the summer months to avoid work during the hottest part of the day for health and safety reasons). During project construction, the workforce is expected to average approximately 250 to 430 employees over the 48-month construction period, with a peak workforce of approximately 619 employees during Months 20 through 22 of the construction period. The project construction workforce would be recruited from within Riverside County and elsewhere in the surrounding region to the extent practicable.

Construction Equipment/Vehicles

Most construction equipment and vehicles for the modified project would be brought to the BSPP at the beginning of the construction process during construction mobilization and would remain on site throughout the duration of the construction activities for which they were needed. Generally, the equipment and vehicles would not be driven on public roads while in use for the project. In addition to construction worker commuting vehicles, as discussed above, construction traffic would include periodic truck deliveries of materials and supplies, recyclables, trash, and other truck shipments.

Site Clearing, Grading, and Compaction

The planned approach to the modified project site preparation is primarily for only clearing and mowing of the site with minimal overall mass grading. In select areas, the limited use of “disc and roll” and micrograding techniques may be utilized, reflecting the results of field testing of various site preparation techniques at an off-site location by one of the PV manufacturers. Large scale grading would only be used in areas where site topography requires smoothing for external fencelines and roads, or where grading is needed for buildings or other project structures.

Project Operation and Maintenance

Operation and Maintenance Workforce

Approximately 15 to 20 permanent, full-time personnel would be employed at the modified BSPP solar plant site during daytime working hours, assuming all units are operational. Temporary personnel would be employed, as needed, during seasonal periods when panel washing is required. Monthly visual inspections and annual (minimum) preventive maintenance would be performed. In accordance with United States Department of Labor, Occupational Safety and Health Administration safety regulations, at least two qualified personnel would be present during all energized electrical maintenance activities at the facility. Site security systems would be monitored regularly by on-site personnel and an off-site 24-hour Remote Operations Center.

Automated Facility Control and Monitoring System

The proposed modified BSPP facility control and monitoring system would have two primary components: an on-site SCADA (supervisory control and data acquisition) system and the accompanying sensor network. The on-site SCADA system would offer near real-time readings of the monitored devices, as well as control capabilities for the devices where applicable. Off-site monitoring/data trending systems would collect historical data for remote monitoring and analysis.

Panel Washing

PV panel washing at the modified project would be performed by seasonal maintenance crews in the fall and spring, taking approximately 20 to 40 days to complete each unit. Approximately 50,000 gallons per day (gpd) per unit would be required for this purpose. Surfactants would not be used in these procedures. The process water would be allowed to run off the modules and evaporate or percolate into the ground.

Road Maintenance

Paved roads at the modified BSPP would be maintained to preserve the asphalt surface from degradation. Maintenance would include seal coating the asphalt surface every 2 to 5 years to prevent decay and oxidization. Potholes or other damage would be repaired as soon as practical.

Unpaved roads at the modified project would be maintained regularly to control the flow of water on and around the road, remove obstacles, and maintain a solid surface. Maintenance would be completed by conducting regular surveys to inspect the conditions of the road surfaces; blading, grading, or compacting the road surfaces to preserve a minimally sloped and smooth planed surface; and applying dust palliatives or aggregate base as needed to reduce dust and erosion.

Hazardous Materials Management

Waste and Hazardous Materials Management

Two separate wastewater collection systems would be provided as part of the modified project: one for sanitary wastes and the other to address the water treatment system wastewater. The sanitary wastewater system would collect sanitary wastewater at the O & M building. Portable chemical toilets would be provided for workers in the solar fields. On-site water treatment would discharge minimal wastewater (up to 60 gallons per minute) to on-site evaporation ponds. The Final Decision allows for each power block to have two 4-acre evaporation ponds, for a total of eight 4-acre evaporation ponds. The modified project would reduce the number of ponds from eight to two.

Construction, operation, maintenance, and decommissioning of the modified BSPP would generate non-hazardous solid wastes typical of power generation or other industrial facilities. Solar plant-related wastes generated during all phases of the project would include oily rags, worn or broken metal and machine parts, defective or broken electrical materials, other scrap metal and plastic, insulation material, empty containers, paper, glass, and other miscellaneous solid wastes, including the typical refuse generated by workers. These materials would be disposed by means of contracted refuse collection and recycling services. Waste collection and disposal would be in accordance with applicable regulatory requirements to minimize health and safety effects.

The operation and maintenance of the project’s linear facilities (e.g., the gen-tie line) would generate minimal quantities of waste.

FACILITY CLOSURE

Facility closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance. Causes for temporary closure include a disruption or damage to the plant from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations, owing to plant age, damage to the plant beyond repair, economic conditions, or other reasons. Because the modified project site is onfederally-managed public land, the BLM would require a closure bond to return the site to its pre-project condition.

The principal materials incorporated into the PV arrays include glass, steel, and various semiconductor metals. Some manufacturers employ the compound cadmium telluride (CdTe) as the semiconductor material. Cadmium telluride is a stable compound consisting of cadmium (Cd) and tellurium (Te). Cd, produced primarily as a byproduct of zinc refining, is a human carcinogen as an independent element; however, when combined with Te, a byproduct of copper refining, it forms the stable, non-hazardous compound CdTe. Modules containing CdTe, may be recycled for use in new solar modules or other new products. If the modified BSPP selects panels that incorporate CdTe, it would participate in the manufacturer's recycling program.

TEMPORARY CLOSURE

For a temporary facility closure of the modified BSPP, where there is no release of hazardous materials, security of the facilities would be maintained on a continuous basis. The Energy Commission would be notified of a temporary closure. Other responsible agencies would also be notified as necessary and appropriate. Depending on the length of shutdown necessary, a contingency plan for the temporary cessation of operations would be implemented. The contingency plan would be conducted to ensure conformance with all applicable laws, ordinances, regulations, and standards (LORS) and the protection of public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, may include the draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes would be disposed of according to applicable LORS.

Where the temporary closure includes damage to the facility, and there is a release or threatened release of regulated substances or other hazardous materials into the environment, procedures would be followed as set forth in a Risk Management Plan and a Hazardous Materials Business Plan, to be developed as described in the Final Decision conditions of certification. Procedures would include methods to control releases, notification of responsible authorities and the public, emergency response, and training for plant personnel in responding to and controlling releases of hazardous materials. Once the immediate problem is solved, and the regulated substance/hazardous material release is contained and cleaned up, temporary closure would proceed as described above for a closure where there is no release of hazardous materials.

PERMANENT CLOSURE

When the modified BSPP is permanently closed, the closure procedure would follow a plan that would be developed. The removal of the facility from service may range from mothballing to the removal of all equipment and appurtenant facilities, depending on conditions at the time. Because the conditions that would affect the closure decision are largely unknown at this time, these conditions would be presented to the Energy

Commission when more information is available and the timing for closure is more imminent.

To ensure that public health and safety and the environment are protected during closure, a closure plan would be submitted to the Energy Commission for approval prior to closure. The plan would address the following:

- Proposed closure activities for the facility and all appurtenances constructed as part of the facility;
- Conformance of the proposed closure activities to all applicable LORS and local/regional plans;
- Activities necessary to restore the site if the plan requires removal of all equipment and appurtenances;
- Closure alternatives, other than complete restoration; and
- Associated costs of the proposed closure and the source of funds to pay for the closure.

In general, the closure plan for the facility would attempt to maximize the recycling of all facility components. The facility owner would attempt to sell unused chemicals back to the suppliers or other purchasers or users. All equipment containing chemicals would be drained and shut down to safeguard public health and safety and to protect the environment. All nonhazardous wastes would be collected and disposed of in appropriate landfills or waste collection facilities. All hazardous wastes would be disposed of according to all applicable LORS. The site would be secured 24 hours per day during the closure activities.

REFERENCES

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NEBS2013a—NextEra Blythe Solar Energy Center, L.L.C. (TN 70318). Revised Petition to Amend (Conversion to PV). Dated April 12, 2013. Submitted to CEC on April 12, 2013.

.NEBS2013b—NextEra Blythe Solar Energy Center, L.L.C. (TN 70465). Repeated Application for Confidential Designation; Treatment Status of Sites Listed in the Conditions of Certification Cultural Resources Map. Dated April 15, 2013. Submitted to CEC on April 16, 2013.

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NEBC2013d—NextEra Blythe Solar Energy Center, L.L.C. (TN 70476). Comparison of Impacts to State Jurisdictional Waters Figure. Dated April 25, 2013. Submitted to CEC on April 25, 2013.

NEBC2013e—NextEra Blythe Solar Energy Center, L.L.C. (TN 71305). Nextera Blythe Solar Energy Center L.L.C.'s Response to CEC Staff Data Request Set 1 (1-19). Dated June 17, 2013. Docketed on June 17, 2013.

NEBC2013f—NextEra Blythe Solar Energy Center, L.L.C. (TN 71500). Addendum I Cultural Resources Class III Report for the Proposed Blythe Solar Power Project. Dated July, 2010.

NEBC2013g—NextEra Blythe Solar Energy Center, L.L.C. (TN 71501). Blythe Solar Power Project Letter Report: Transmission Line Reroute. Dated July. 2010.

NEBC2013h—NextEra Blythe Solar Energy Center, L.L.C. (TN 71634). Addendum I Cultural Resources Class III Report Attachments 4, 5 & 6 for the Proposed Blythe Solar Power Project. dated July, 2010.

PVSI2009a—Palo Verde Solar I, L.L.C. (TN 52937). Blythe Solar Power Project Application for Certification Volumes 1 & 2. Submitted to the CEC on August 24, 2009.

PVSI 2011a—Palo Verde Solar I, L.L.C. (TN 61148). Blythe Solar Power Project - Petition to Amend - Facility Design and Transmission Line Location. Dated June, 2011. Submitted to CEC on June 14, 2011.

PVSI 2012a—Palo Verde Solar I, L.L.C. (TN 66026). Palo Verde Solar I, L.L.C.'s Petition for Amendment (Conversion to PV). Dated June 28, 2012. Submitted to CEC on June 28, 2012.

PVSI2012b—Palo Verde Solar I, L.L.C. (TN 66027). Palo Verde Solar I, LLC's Petition for Amendment Air Quality Modeling Files. Dated June 28, 2012. Submitted to CEC on June 28, 2012.

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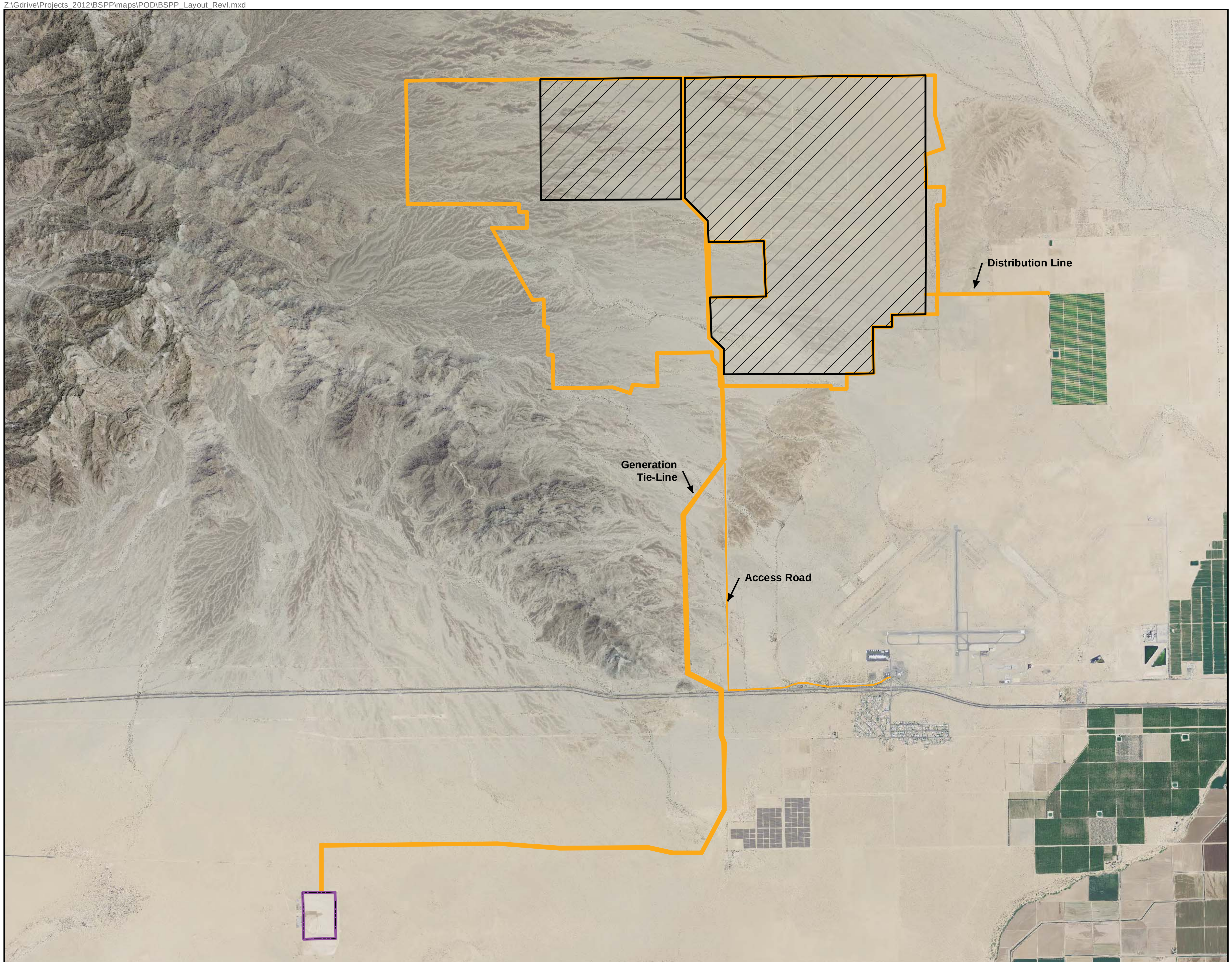

BLYTHE SOLAR POWER PROJECT RIVERSIDE COUNTY, CA

Legend

- Approved Solar Thermal Project Boundary/Features
- Modified Project- PV Technology, 4,070 acres (Reduced from 6,831 acres)
- SCE Colorado River Substation

0 2,500 5,000 10,000
Feet

Notes:
(a) UTM Zone 11, NAD 1983 Projection.
(b) Source data: USDA, Tt, Worley Parsons

FIGURE 2-2
PROJECT FEATURES

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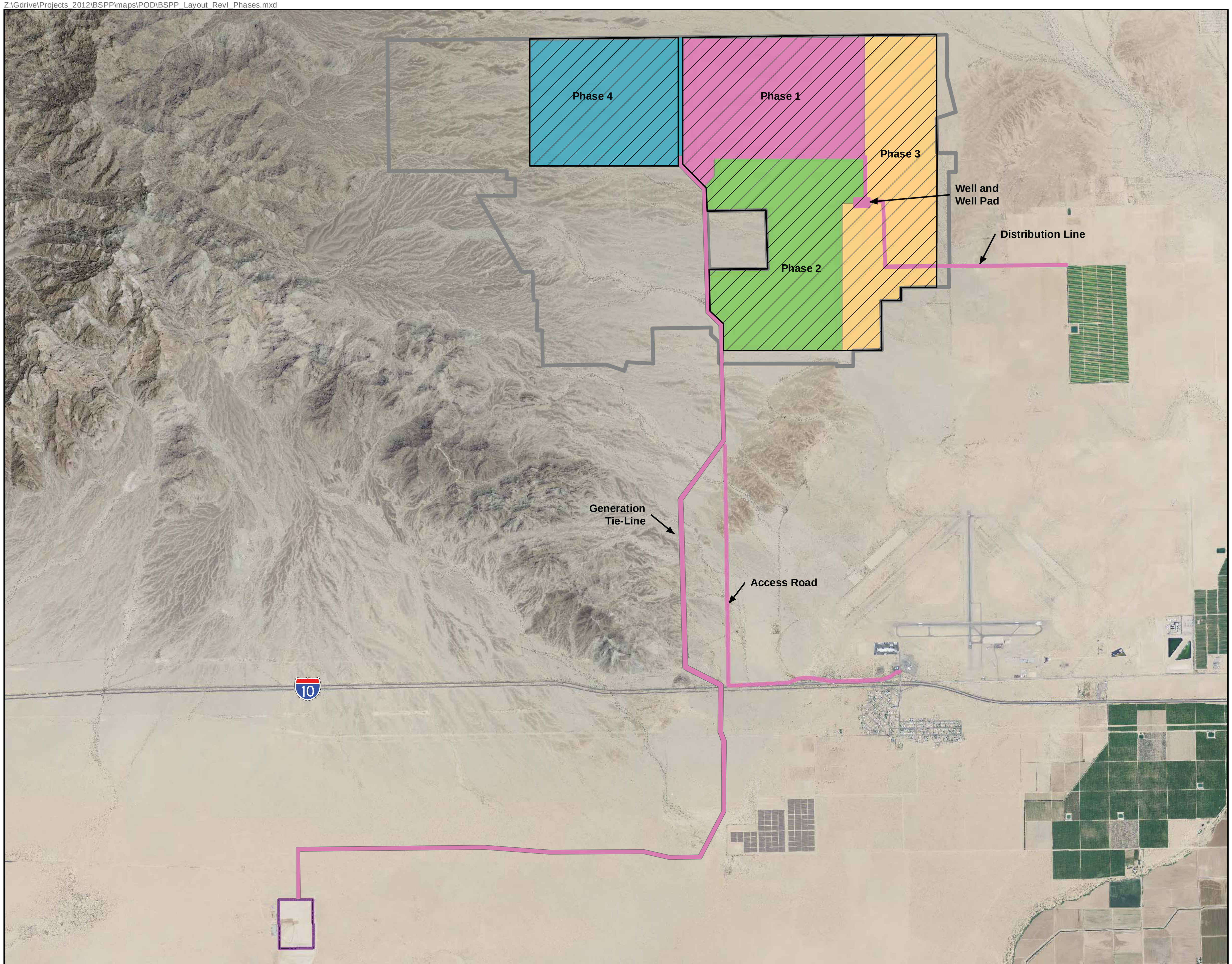


BLYTHE SOLAR POWER PROJECT RIVERSIDE COUNTY, CA

Legend

Approved Solar Thermal Project Boundary

Modified PV Solar Plant Site
4,070 acres (reduced from 6,831 acres)

SCE Colorado River Substation

Project Phasing

Phase 1

Phase 2

Phase 3

Phase 4

0 2,500 5,000 10,000

Feet

Notes:
(a) UTM Zone 11, NAD 1983 Projection.
(b) Source data: USDA, TTEC

FIGURE 2-3
PROJECT PHASING

TETRA TECH

Environmental Assessment

AIR QUALITY

Testimony of Jacquelyn Leyva Record

SUMMARY OF CONCLUSIONS

California Energy Commission staff (hereinafter referred to as “staff”) concludes that with the adoption of the attached conditions of certification, the proposed Blythe Solar Power Project would comply with all applicable laws, ordinances, regulations, and standards and would not result in any significant California Environmental Quality Act (CEQA) air quality impacts.

Staff concludes that the proposed project would not have the potential to exceed Prevention of Significant Deterioration emission threshold levels during direct source operation and the facility is not considered a major stationary source with potential to cause adverse National Environmental Policy Act (NEPA) air quality impacts.

The Blythe Solar Power Project would emit substantially lower greenhouse gas[1] emissions per megawatt-hour than fossil fueled generation resources in California. The Blythe 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 598, Statues of 2006, Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

INTRODUCTION

On April 12, 2013, NextEra Blythe Solar Energy Center, LLC (NextEra Blythe Solar) filed a revised Petition to Amend with the Energy Commission requesting to modify the Final Decision for the Blythe Solar Power Project (Approved BSPP). The project was licensed by the California Energy Commission (Energy Commission) as a 1,000-megawatt (MW) solar thermal power-generating facility utilizing parabolic trough technology on approximately 7,043 acres. The project site is located approximately 8 miles west of the City of Blythe and 2 miles north of the Interstate-10 freeway, on land managed by the Bureau of Land Management (BLM) in Riverside County, California.

The Final Decision allowed the Approved BSPP to be constructed in phases. The BLM published the Plan Amendment/Record of Decision (PA/ROD) on October 22, 2010, and issued the Right-of-Way Grant (ROW No. CACA-048811) on November 4, 2010. On November 4, 2010, the original project owner, Palo Verde Solar I, LLC (PVSI), obtained a Notice to Proceed from the Energy Commission Compliance Project Manager for construction of Phase 1A of the Approved BSPP and immediately began construction.

[1] Greenhouse gas 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.

This analysis evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the proposed modified Blythe Solar Power Project (Modified BSPP or proposed project). Criteria air pollutants are defined as air contaminants for which the state and/or federal governments have established ambient air quality standards to protect public health.

The criteria pollutants analyzed within this section are nitrogen dioxide (NO2), sulfur dioxide (SO2), carbon monoxide (CO), ozone (O3), 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 document. 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 NO2) and volatile organic compound (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, staff evaluated the following four major issues:

- Whether the proposed project is likely to conform with applicable federal, state, and Mojave Desert Air Quality Management District (MDAQMD or District) air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));
- Whether the proposed project 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 the proposed project are adequate to lessen potential impacts under CEQA to a level of insignificance (Title 20, California Code of Regulations, section 1742 (b)); and
- Whether the Modified BSPP project would exceed regulatory benchmarks used to analyze NEPA air quality impacts, before or after implementation of recommended mitigation measures.

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.

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 proposed BSPP are summarized in **Air Quality Table 1**. Staff's analysis examines the project's compliance with these requirements.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
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.
Title13,CCR, section 2423	Exhaust Emission Standards and Test Procedures: Heavy-Duty Off-Road Diesel Cycle Engines. Limits the tier levels of emissions from heavy-duty off-road diesel cycle engines.
Local (Mojave Desert Air Quality Management District, MDAQMD)	
Rules 401, 402, and 403 Nuisance, Visible Emissions, Fugitive Dust	Limits the visible, nuisance, and fugitive dust emissions and would be applicable to the construction period of the project.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff assesses four kinds of primary and secondary[2] 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. Operational impacts result from the emissions of the proposed project during operation, which includes the onsite maintenance vehicle emissions, and the offsite employee and material delivery trip emissions, there are no stationary permanent sources planned during operation. Closure and decommissioning impacts occur from the onsite and offsite emissions that would result from dismantling

[2] 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.

the facility and restoring the site. Cumulative impacts 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.)

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 California Air Resources Board (ARB) and the U.S. Environmental Protection Agency (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.

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.

PROPOSED MODIFIED BSPP PROJECT

The Modified BSPP includes replacing the solar thermal technology completely with PV generating technology and reducing the physical size of the project. Linear access to the site would be the same as the Approved BSPP, except the natural gas lines are no longer needed, and the Modified BSPP would continue to interconnect to the regional transmission grid via the same proposed gen-tie line to Southern California Edison’s (SCE’s) Colorado River Substation, which is currently under construction.

NextEra Blythe Solar proposes to develop the BSPP in four operational phases designed to generate a total of approximately 485 MW of electricity rather than the 1,000 MW of the Approved BSPP. The first three units (phases) would consist of approximately 125 MW each. The fourth unit would generate approximately 110 MW. All four units would share an operations and maintenance facility, one on-site switchyard, access and maintenance roads, perimeter fencing and other ancillary security facilities, and a 230-kV gen-tie line. The transmission corridor would be located in the center of the site with the exact location to be determined during final design.

NextEra Blythe Solar has not selected the specific PV modules nor has it decided whether a single-axis tracking modular system, fixed-tilt system, or combination of the two systems would be installed. While both systems are similar in how they generate and distribute electricity, the orientation and technique for collection of the sun’s energy are different. NextEra Blythe Solar is requesting the Final Decision be amended in such a way as to allow the specific combination of technologies to be selected prior to construction without the need for filing another amendment.

The Modified BSPP project would be located entirely on publicly owned land managed by BLM, a total of 4,070 acres, excluding off-site linear facilities, which is approximately 2,700 acres less than the original approved 7,043 acres (**Project Description Figure 1**).

During operations, all four units would share an operations and maintenance facility, one on-site switchyard, access and maintenance roads (either dirt, gravel, or paved), perimeter fencing and other ancillary security facilities, and a 230-kV gen-tie line.

The primary modifications to the Approved BSPP are as follows:

- The previously planned four power blocks (which each included a steam turbine, evaporation pond, auxiliary boiler, air-cooled condenser, and equipment) and structures have been eliminated.
- The Land Treatment Units for HTF have been eliminated.
- The parabolic trough energy collection systems and associated HTF piping systems have been eliminated and replaced with PV panels configured for either horizontal tracking or fixed-tilt operations.
- The large assembly hall has been eliminated.
- The concrete batch plant has been eliminated.
- The natural gas line has been eliminated.
- The amount of mass grading has been greatly reduced.
- The footprint has been modified to allow transmission and access road corridors to accommodate the NextEra McCoy and the EDF Renewable Energy[3] projects proposed to the north of the BSPP.
- The auxiliary boilers which burn natural gas and are used for freeze protection of the HTF and cold startup of the steam generators will no longer be needed.
- Emergency generators and fire water pump engines which burn diesel fuel are no longer planned for the modified BSPP.
- The length of time needed for construction is decreased from 69 months to up to 48 months.
- The fuel depot has been eliminated (diesel fuel will be obtained from fueling trucks brought on-site and gasoline will be obtained from a nearby gasoline station in Blythe).

The list above largely encompasses the items that were eliminated or reduced by the switch in technology from parabolic trough solar thermal to PV technology. There would also be approximately 2,700 acres reduction in the size of the BSPP footprint from 6,831 acres to 4,070 acres.

SETTING AND EXISTING CONDITIONS

Climate and Meteorology

The proposed project is located in the southern California's Colorado Desert, about eight miles west of Blythe approximately 1,000 feet above sea level. Relatively high daytime temperatures, large variations in relative humidity, large and rapid diurnal temperature changes, occasional high winds, and sand, dust, and thunderstorms characterize the climate of the Colorado Desert area. The aridity of the region is influenced by a sub-tropical high-pressure system typically off the coast of California

[3] EDF Renewable Energy is the U.S. subsidiary of EDF Energies Nouvelles. EDF Energies Nouvelles is the renewable energy arm of the EDF group, a world-wide electricity company.

and topographical barriers that effectively block the flow of moisture to the region. The Colorado Desert experiences two rainy seasons per year (the winter rainy season and the summer monsoon season), unlike the Mojave Desert which has only one primary rainy season (the winter rainy season).

The highest monthly average high temperature in Blythe is 109°F in July and the lowest average monthly low temperature is 39°F in January and December (WC 2013). Total rainfall in Blythe averages just less than four inches per year with about 50 percent of the total rainfall occurring during the December through March winter rainy season, and about 30 percent occurring during the August/September summer monsoon season. Staff reviewed current wind rose data on the Western Regional Climate Center website (WRCC 2013). This wind data indicates the highest wind direction frequencies for the annual, winter, spring, and fall periods are from the west through the southwest. Prevailing winds in the Mojave Desert Air Basin (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. The MDAB is separated from the southern California coastal and central California valley regions by mountains (highest elevation approximately 10,000 feet), whose passes form the main channels for these air masses (MDAQMD 2009).

The most recent meteorological (weather) data, collected from the Blythe Airport Meteorological Site located approximately three miles southeast of the project site, and from the Blythe Monitoring site located approximately ten miles east of the project site, was for 2006 through 2013. These wind roses show that for most of the year, the winds are from the west-southwest, although between November through March, winds are predominately from the northeast. Mixing heights in the area, which represent the altitudes where different air masses mix together, are estimated to be on average 230 feet (70 meters) in the morning to as high as 5,250 feet (1,600 meters) above ground level in the afternoon.

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 three-mile radius of the project site. The nearest sensitive receptor (Palo Verde High School) is approximately 6.7 miles east of the project in the City of Blythe. There are a few farm residences, primarily to the east and south, more than one mile from the site. The nearest resident is located approximately 0.1 mile to the south.

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 ambient air quality standards are listed in **Air Quality Table 2**. The averaging times for the various ambient 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).

Since the March 2010 Staff Assessment, the implementation of new Ambient Air Quality Standards (AAQS) has led to changes in the categorization of air quality in the BSPP project area. A new 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (NAAQS) became effective on April 12, 2010. In addition, a new 1-hour SO_2 NAAQS was established and the existing 24-hour and annual primary SO_2 NAAQS were revoked on June 2, 2010.

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 $\mu g/m^3$)	0.070 ppm (137 $\mu g/m^3$)
	1 Hour	—	0.09 ppm (180 $\mu g/m^3$)
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 $\mu g/m^3$)	0.03 ppm (57 $\mu g/m^3$)
	1 Hour	0.100 ppm[b]	0.18 ppm (339 $\mu g/m^3$)
Sulfur Dioxide (SO_2)	Annual	0.030 ppm (80 $\mu g/m^3$)	—
	24 Hour	0.14 ppm (365 $\mu g/m^3$)	0.04 ppm (105 $\mu g/m^3$)
	3 Hour	0.5 ppm (1300 $\mu g/m^3$)	—
	1 Hour	0.075 ppm (196 $\mu g/m^3$)[c]	0.25 ppm (655 $\mu g/m^3$)
Particulate Matter (PM10)	Annual	—	20 $\mu g/m^3$
	24 Hour	150 $\mu g/m^3$	50 $\mu g/m^3$
Fine Particulate Matter (PM2.5)[d]	Annual	15 $\mu g/m^3$	12 $\mu g/m^3$
	24 Hour	35 $\mu g/m^3$	—
Sulfates (SO_4)	24 Hour	—	25 $\mu g/m^3$
Lead	30 Day Average	—	1.5 $\mu g/m^3$
	Calendar Quarter	1.5 $\mu g/m^3$	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 $\mu g/m^3$)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 $\mu g/m^3$)
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 - On April 30, 2012, U.S. EPA issued final area designations and classifications for the 2008 (0.075 ppm) 8-hour ozone standard.

b - On October 19, 2012, U.S. EPA published a proposed rule in the Federal Register revising ambient NO2 monitoring requirements. Previously, near-roadway NO2 monitors were required to be deployed by January 1, 2012; the proposal would establish a phased deployment, with deployment required between January 1, 2014 and January 1, 2017.

c - On June 2, 2010, the U.S. EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO_2 NAAQS however must continue to be used until one year following U.S. EPA initial designations of the new 1-hour SO_2 NAAQS.

Source: ARB 2013a (www.arb.ca.gov/desig/feddesig.htm)

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 MDAB. The Riverside County portion of the MDAB is designated as non-attainment for the state ozone and PM10 standards. This area is designated as attainment or unclassified for all federal criteria pollutant ambient air quality standards and the state CO, NO_2, SO_2, and 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 [a]	
	Federal	State
Ozone	Attainment [b]	Moderate Nonattainment
CO	Attainment	Attainment
NO_2	Attainment [c]	Attainment
SO_2	Attainment	Attainment
PM10	Attainment [b]	Nonattainment
PM2.5	Attainment	Attainment

Source: ARB 2013b, U.S.EPA 2013a.
[a] Attainment = Attainment or Unclassified, where Unclassified is treated the same as Attainment for regulatory purposes.
[b] Attainment status for the site area only, not the entire MDAB.
[c] On February 17, 2012, the U.S. Environmental Protection Agency designated all of the United States as "unclassifiable/ attainment" for the short-term federal NO_2 standard, effective February 29, 2012.

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 2008 through 2012 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 2004 through 2012 (PM10 and PM2.5) are shown in **Air Quality Figure 1**. The normalized line represents the ambient air quality standard value; data above this line exceed the corresponding ambient air quality standard. Ozone data are from the Blythe-445 West Murphy Street monitoring station which is approximately 9 miles southeast of the project site, PM10, PM2.5, NO_2, and CO data are from the Palm

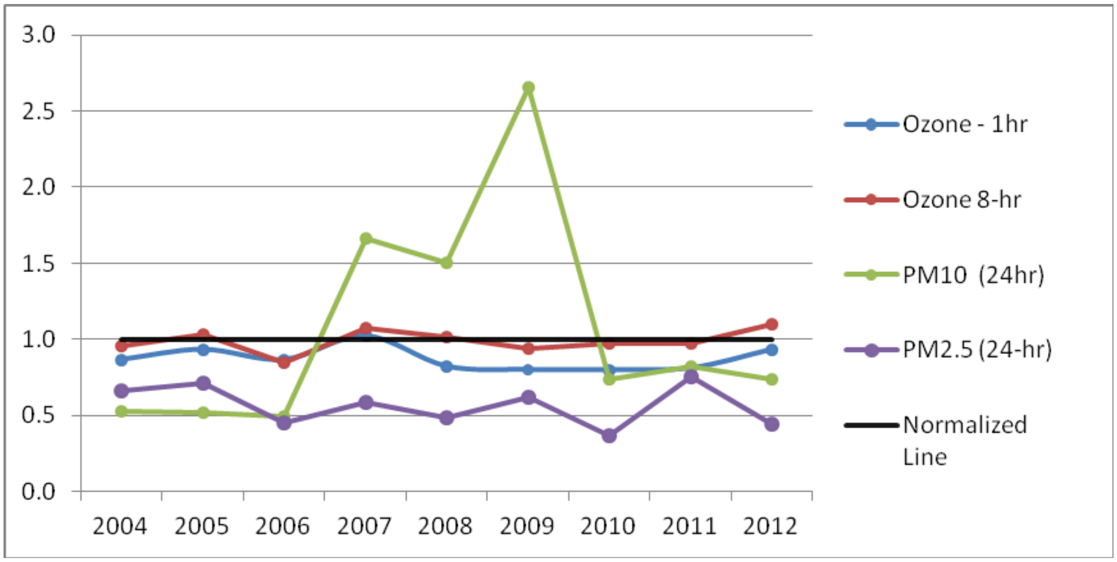
Springs-Fire Station monitoring station which is located approximately 100 miles west of the project site and SO_2 data are from the Victorville-14306 Park Avenue monitoring station which is located approximately 160 miles northwest of the project site. **Bold** and shaded values in **Air Quality Table 4** are recommended background values listed in **Air Quality Table 5**.

Air Quality Table 4
Criteria Pollutant Summary
Maximum Ambient Concentrations (ppm or μg/m^3)

Pollutant	Monitoring Station	Averaging Period	Units	2008	2009	2010	2011	2012	Limiting AAQS[c]
Ozone	Blythe–445 West Murphy Street	1 hour	ppm	0.074	0.072	0.072	0.073	0.084	0.09
Ozone	Blythe–445 West Murphy Street	8 hours	ppm	0.071	0.066	0.068	0.068	0.077	0.07
PM10 [a,b]	Palm Springs-Fire Station	24 hours	μg/m^3	75	**133.0**	37	41	37	50
PM10 [a,b]	Palm Springs-Fire Station	Annual	μg/m^3	**23.2**	*	18.3	18.1	16.1	20
PM2.5 [a]	Palm Springs-Fire Station	24 hours	μg/m^3	17.1	21.8	12.8	**26.3**	15.5	35
PM2.5 [a]	Palm Springs-Fire Station	Annual	μg/m^3	**7.2**	*	5.9	6.0	6.5	12
CO	Palm Springs-Fire Station	1 hour	ppm	1.3	2.3	1.6	**3.0**	0.90	20
CO	Palm Springs-Fire Station	8 hours	ppm	0.54	**0.67**	0.50	0.60	0.50	9.0
NO_2	Palm Springs-Fire Station	1 hour	ppm	**0.049**	0.048	0.046	0.045	0.045	0.18
NO_2	Palm Springs-Fire Station	Federal 1 hour (98th percentile)	ppm	**0.045**	0.039	0.039	0.039	0.039	0.10
NO_2	Palm Springs-Fire Station	Annual	ppm	**0.009**	0.008	0.009	0.008	*	0.03
SO_2	Palm Springs-Fire Station	1 hour	ppm	0.005	0.006	**0.011**	0.007	0.005	0.25
SO_2	Victorville–14306 Park Avenue	3 hour	ppm	0.006	**0.006**	0.006	0.005	0.005	0.5
SO_2	Victorville–14306 Park Avenue	24 hours	ppm	0.002	0.005	**0.007**	0.007	0.003	0.04
SO_2	Victorville–14306 Park Avenue	Annual	ppm	**0.0011**	0.000	0.000	0.001	*	0.03

Source: ARB 2013c, U.S.EPA 2013b, MDAQMD 2013.
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.
* means there was insufficient data available to determine the value.
Bold and shaded values were used as staff's recommended background values in **AQ Table 5**.

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 - Ozone data are from Blythe–445 West Murphy Street monitoring station and the PM data are from the Palm Springs station.
c - All PM data are from Palm Springs monitoring station.
Source: ARB 2009c, U.S.EPA 2013b

Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted nitrogen oxides (NOx) and hydrocarbons (Volatile Organic Compounds [VOCs]) in the presence of sunlight 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 fairly level over time. The collected air quality data (not shown) indicate that the relatively infrequent 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 or unclassified for the state 1-hour and annual and federal annual NO_2 standards. The nitrogen dioxide attainment standard could change due to the new federal 1-hour standard, although a review of the air basin wide monitoring data suggest this would not occur for the MDAB.

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

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 has a lack of significant mobile source emissions and has CO concentrations that are 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 state PM10 standards and unclassified for the federal PM10 standard. **Air Quality Table 4** and **Air Quality Figure 1** shows recent PM10/PM2.5 concentrations. 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. The MDAB is designated as nonattainment for the state PM10 standard.

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.

The entire MDAB is classified as attainment for the federal PM2.5 standard and, in the project area, is designated unclassified for the state PM2.5 standards. This divergence in the PM10 and PM2.5 concentration levels and attainment status indicates that a substantial fraction of the ambient particulate matter levels are most likely due to localized fugitive dust sources, such as vehicle travel on unpaved roads, agricultural operations, or wind-blown dust[4].

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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.

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 five years of available data collected at the most representative monitoring stations surrounding the project site.

Air Quality Table 5
Staff Recommended Background Concentrations (μg/m^3)

Pollutant	Averaging Time	Recommended Background	Limiting AAQS [b]	Percent of Standard
NO_2	1 hour	92.3	339	27%
	Federal 1 hour (98th percentile)	84.6	188	46%
	Annual	17	57	30%
CO	1 hour	3,450	23,000	15%
	8 hour	744	10,000	7%
PM10	24 hour	133	50	266%
	Annual	23.2	20	116%
PM2.5	24 hour [a]	26.3	35	75%
	Annual	7.2	12	60%
SO_2	1 hour	28.7	196	15%
	3 hour	15.6	1,300	1%
	24 hour	18.4	105	18%
	Annual	2.9	80	4%

Source: ARB 2013c, U.S.EPA 2013b and Energy Commission Staff Analysis
Notes:
[a] PM2.5 24-hour data shown in **Air Quality Table 4** and **Table 5** 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 9 miles east southeast of the project site, is the closest monitoring station. The Palm Springs monitoring station (PM10, PM2.5 and NO_2 and CO) is located approximately 100 miles west of the project site. The Victorville monitoring station (SO_2) is located approximately 160 miles west northwest of the project site. In general, 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 at or 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.).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides estimates of criteria pollutant emissions associated with the construction and operation of the Modified BSPP project. The construction phase of the Modified BSPP project would use many of the same construction activities associated with grading of the site similar to the Approved BSPP project. However, for the scope of construction is reduced due to reduced acreage and the ability to use more surface variability for the PV modules. In addition, operating period impacts are also less than the Approved BSPP project due to discontinued use of the solar thermal technology which eliminates emissions associated with the use of HTF, the combustion of natural gas, and the rigorous mirror washing of the Approved BSPP project.

Project Description

The Modified BSPP project includes replacing the solar thermal technology completely with PV generating technology and reducing the physical size of the project. NextEra Blythe Solar proposes to develop the Modified BSPP in four operational phases designed to generate a total of approximately 485 MW of electricity. The first three units (phases) would consist of approximately 125 MW each. The fourth unit would generate approximately 110 MW.

PV panel washing would be performed by seasonal maintenance crews in the fall and spring, taking approximately 20 to 40 days to complete for each unit. Approximately 50,000 gallons of water per day (gpd) per unit would be required for this purpose. Approximately 25 to 35 acre-feet per year (AFY) of water would be required to wash the panels for the entire Modified BSPP project.

Project Emissions

Project Construction

The construction of the Modified BSPP project would begin after all applicable approvals and permits have been obtained, currently anticipated to be as early as June 2014, and after the preconstruction surveys, construction mobilization, and site preparation are completed. Work would be completed in phased stages moving across the site so that completion of the first phase and gen-tie line would be closely followed by the beginning of the next. Construction of all of the phases is anticipated to take approximately 48 months from the commencement of the construction process to completion of the Modified BSPP project.

During project construction, the workforce is expected to average approximately 250 to 430 employees over the 48-month construction period, with a peak workforce of approximately 619 employees during Months 20 through 22 of the construction period. The project construction workforce would be recruited from within Riverside County and elsewhere in the surrounding region to the extent practicable.

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 on-road vehicles, including heavy duty diesel trucks used to deliver materials, other on-road 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; construction of power plant facilities, roads, and switchyard; the installation of the new transmission line, and the new onsite water pipelines; and vehicle travel on paved and unpaved roads. The Modified BSPP project would no longer need to construct a natural gas pipeline, and the scope of on-site construction would be reduced because the PV modules can be built on more undulating ground and the disturbed acreage would be reduced by about 2,700 acres.

The annual emissions for the shorter duration offsite construction activities are based on the following construction duration:

- Access Road Construction – 3 months
- Transmission Line Construction – 9 months

The applicant's mitigated maximum daily and annual construction emission estimates for the entire project are provided below in **Air Quality Tables 6** and **7**. Emissions estimated for the Modified BSPP project are shown in the upper portion of each table and emissions for the Approved BSPP project are shown in the lower portion of each table. As seen in **Air Quality Table 6**, for criteria pollutants of NOx, SOx, CO, and VOCs the emissions decrease from the current Approved BSPP project to the proposed Modified BSPP project are estimated to be greater than eighty percent on a daily basis for these criteria pollutants, and more than fifty percent on an annual basis. For particulate matter emissions (PM10 and PM2.5) the modified project would have reductions of about 25 percent for PM10 and 50 percent for PM2.5.

Air Quality Table 6
BSPP 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	113.8	14.3	53.7	4.4	4.0	0.2
On-road Equipment Exhaust	8.7	0.3	1.2	0.3	0.3	0.0
Asphaltic Paving	--	0.03	--	--	--	--
Fugitive Dust from Unpaved Roads	--	--	--	598.5	59.9	--
Fugitive Dust from Constr. Activities	--	--	--	75.9	23.1	--
Subtotal - Power Block Onsite Emissions	**122.5**	**14.6**	**54.9**	**679.1**	**87.3**	**0.2**
Power Block On-road Equipment (offsite)	333.3	40.4	304.2	25.2	12.5	0.7
Access Road Construction (offsite)	211.84	24.20	92.78	114.92	39.87	0.45
Transmission Line Construction (offsite)	13.67	1.55	15.81	8.30	3.02	0.03
Approved BSPP Project Emissions						
Subtotal - Power Block Onsite Emissions	**878.24**	**95.28**	**488.82**	**920.90**	**186.15**	**1.9**
Percent Decrease in Onsite Emissions between Proposed and Approved projects	- 83%	-84%	-88%	-26%	-53%	-89%

Source: NEBC2013c, Tables 4.2-1 & 4.2-3, NextEra Blythe Solar Energy Center
1 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.
2 Access road and transmission line construction emissions are expected not to change from the current approved project for offsite linear activities expect for a previously estimated gas pipeline construction, which is no longer needed for the proposed project.

Air Quality Table 7
BSPP Construction - Maximum Annual Emissions (tons/year)

	NOx	VOC	CO	PM10	PM2.5	SOx
Construction Emissions						
Main Power Block (entire project)						
Off-road Equipment Exhaust	12.4	1.5	5.6	0.4	0.5	0.0
On-road Vehicles (onsite and offsite)	1.0	0.0	0.2	0.0	0.0	0.0
Asphaltic Paving	--	0.01	--	--	--	--
Fugitive Dust from Unpaved Roads	--	--	--	60.5	5.9	--
Fugitive Dust from Constr. Activities	--	--	--	8.6	2.8	--
Subtotal - Power Block Emissions	**13.4**	**1.6**	**5.8**	**69.5**	**9.2**	**0.1**
Power Block On-road Equipment (offsite)	39.7	4.3	31.7	2.8	1.4	0.1
Access Road Construction (offsite)	4.66	0.53	2.04	2.53	0.88	0.01
Transmission Line Construction (offsite)	0.87	0.10	1.10	0.63	0.23	0.00
Approved BSPP Project Emissions						
Subtotal - Power Block Onsite Emissions	**101.86**	**11.45**	**57.70**	**103.19**	**21.20**	**0.22**
Percent Decrease in Onsite Emissions between Proposed and Approved projects	-86%	-86%	-90%	-32%	-56%	-54%

Source: NEBC2013c, Tables 4.2-2, & 4.2-3, NextEra Blythe Solar Energy Center

Note:
1 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.
2 Access road and transmission line construction emissions are expected not to change from the current approved project for offsite linear activities expect for a previously estimated gas pipeline construction, which is no longer needed for the proposed project.

Project Operation

The Modified BSPP facility would be a nominal 485 Megawatt (MW) PV solar generating facility. The direct air pollutant emissions from power generation are negligible; however, there would be onsite equipment and maintenance vehicle emissions that would be primarily associated with the mirror washing.

The following are operating emission source assumptions that were used to develop the operation emissions estimates for the Modified BSPP project (there are no stationary sources that were assumed as part of the proposed modified project's operational emissions estimates):

<u>Stationary emissions sources:</u>

- Staff has included emissions for a 35 HP diesel-powered portable generator that would be used for lights. This source would not require a permit with the local air district because it would be below the 50 horsepower (HP) threshold at which a permit is required. However, the emissions are shown as part of the total emissions for project operations.

Mobile emissions sources:

- Staff has included emissions for employee trips, assuming 29 employees per day averaging 40 miles round trip per employee (Appendix E Table 11a NEBC 2013c).
- 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 panel washing cycle or event may be conducted quarterly. The applicant has conservatively estimated emissions from two panel washing machines traveling 10 miles per day for 365 days a year (AQ Appendix E Table 9a NEBC 2013c). Although this scenario may not be necessary to keep the PV panels clean, for estimation purposes, this leads to a conservative estimate for these emissions.

The Modified BSPP onsite stationary and onsite and offsite mobile source emissions, totaled for all four power units, are estimated and summarized in **Air Quality Tables 8** and **9**. As seen in **Air Quality Table 8**, for all criteria pollutants (with the exception of VOCs which are at around eighty percent decrease on a daily basis and ninety nine percent annually) the decrease in emissions from the currently Approved BSPP project to the proposed Modified BSPP project are estimated to be greater than ninety percent on a daily and annual basis for onsite emissions.

Air Quality Table 8
BSPP Operations - Maximum Daily Emissions (lbs/day)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Operation Emissions						
Onsite Maintenance Vehicles Exhaust	0.07	0.01	0.04	0.00	0.00	0.00
Onsite Motor Vehicle Fugitive PM	--	--	--	48.56	4.86	--
Offroad Equipment	1.03	0.05	0.73	0.03	0.03	0.00
30 HP Portable Light Plant Generator	1.0	0.1	0.7	0.0	0.0	0.0
Subtotal of Onsite Emissions	2.1	0.16	1.47	48.6	4.9	0.00
Offsite Emissions						
Delivery Vehicles	1.6	0.03	0.21	0.02	0.02	0.00
Employee Vehicles	1.01	0.88	6.82	0.03	0.03	0.01
Subtotal of Offsite Emissions	2.6	0.91	7.03	0.05	0.05	0.01
Total Maximum Daily Emissions	4.7	1.06	8.5	48.65	4.95	0.01
Approved BSPP Project Emissions						
Subtotal of Onsite Emissions	**147.78**	**219.86**	**144.84**	**835.55**	**106.77**	**0.66**
Percent Decrease in Onsite Emissions between Proposed and Approved projects	**-98%**	**-82%**	**-99%**	**-94%**	**-95%**	**-100%**

Source: NEBC 2013c (AQ Appendix E Tables 7a, 10a and 11b)

Air Quality Table 9
BSPP Operations - Maximum Annual Emissions (tons/yr)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Operation Emissions						
Onsite Maintenance Vehicles	0.01	0.00	0.01	0.00	0.00	0.00
Onsite Motor Vehicle Fugitive PM	--	--	--	6.66	0.67	--
Offroad Equipment	0.05	0.00	0.04	0.00	0.00	0.00
30 HP Portable Light Plant Generator	0.053	0.0026	0.037	0.0017	0.0015	0.0001
Subtotal of Onsite Emissions	0.113	0.0026	0.087	6.662	0.671	0.0001
Offsite Emissions						
Delivery Vehicles	0.0069	0.0002	0.0013	0.0001	0.0001	0.000
Employee Vehicles	0.10	0.11	0.86	0.002	0.002	0.0014
Subtotal of Offsite Emissions	0.107	0.11	0.861	0.002	0.002	0.0014
Total Maximum Annual Emissions	0.22	0.11	0.95	6.66	0.67	0.0015
Approved BSPP Project Emissions						
Subtotal of Onsite Emissions	**4.68**	**35.37**	**6.53**	**74.54**	**9.12**	**0.04**
Percent Decrease in Onsite Emissions between Proposed and Approved projects	**-97%**	**-99%**	**-98%**	**-91%**	**-92%**	**-99%**

Source: NEBC 2013c (AQ Appendix E Tables 7c, 10b and 11b)

Overlapping Project Construction/Operation

This proposed project includes the construction of four separate power blocks that would start operation at different periods as each completes construction. Therefore, there would be some overlap between the project construction and operation emissions. However, the maximum short term and annual construction period emissions are forecast to occur only during the early portion of the construction period and they would not overlap with the operation of the first power block. 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 emissions overlap. 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 four power units becomes 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.

Construction Impacts and Mitigation

Construction Modeling Analysis

The construction modeling was not redone for the Modified BSPP project. Since the same earth grading techniques and types of construction equipment would be used in both cases, the modeling scenarios would be essentially the same, but with lower emissions. According to **Air Quality Tables 6** and **7**, construction emissions are estimated to decrease by more than fifty percent for all criteria pollutants with the exception of PM10 which is estimated to decrease around twenty six percent. For the Approved BSPP project, the modeling analysis demonstrated compliance with applicable ambient air quality standards for all pollutants except PM10, which was exceeded because the background value chosen was already well over the California standards. Since the Applicant is not proposing changes to any PM10-related mitigation measures, staff agrees that PM10 modeling is not necessary for the modified project.

The NO_2 and PM2.5 impacts for the Approved BSPP project were close (ninety-nine percent) to the applicable short-term (1-hour and 24-hour, respectively) standards. Since the maximum daily emissions for the Modified BSPP project of NOx and PM2.5 reflect a decrease of eighty percent and fifty three percent, respectively, for these pollutant emissions compared to the Approved BSPP project, it is safe to assume that the modeling analyses using the same conservative assumptions would show the Modified BSPP project to be in compliance with these standards by a wider margin. Therefore, impacts would remain less than significant with the implementation of the mitigation measures as required by Energy Commission Conditions of Certification **AQ-SC1** through **AQ-SC5**. Since the Applicant is not proposing changes to any NOx or PM2.5 related mitigation measures, staff agrees that NO_2 modeling is not necessary for the Modified BSPP project.

In light of the existing ozone non-attainment status for the project site area, staff considers the construction NOx and VOC emissions to be potentially CEQA significant and recommends that the off-road equipment NOx and VOC emissions be mitigated pursuant to CEQA.

Staff concludes that with implementation of staff-proposed mitigation measures the construction impacts would not contribute substantially to exceedances of PM10 or ozone standards.

Construction Mitigation

Adequacy of Proposed Mitigation

Staff recommends that the applicant be required to meet the already approved 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**. **AQ-SC5** is proposed to be updated to reflect current requirements under the ARB's in-use off road diesel vehicle program. While the wording is updated, there is no change to the intent of the condition, which is to require the diesel fueled construction equipment to use the cleanest engines available. 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

Modeling during operations was also not redone for the Modified BSPP project. As shown in **Air Quality Tables 8** and **9**, the daily and annual emissions from both the stationary equipment and the maintenance vehicles for the Modified BSPP project are greater than 80 percent lower reduction in emissions than the Approved BSPP project for all criteria pollutants. The modeling analysis for the Approved BSPP project from operation emissions resulted in similar impacts to those discussed above for the construction phase, and like construction, with the substantially reduced emissions from the Modified BSPP project, impacts would remain less than significant with the implementation of the mitigation measures as required by Energy Commission Conditions of Certification **AQ-SC6** and **AQ-SC7**.

Operation Mitigation

> The Modified BSPP project is not expected to have any permitted stationary sources that would require mitigation.

Emergency Equipment

> Emergency generator engines and fire water pump engines which burn diesel fuel, will not be utilized for the Modified BSPP.

Auxiliary Boilers

> The natural gas-fueled auxiliary boilers that were planned to be used for freeze protection of the HTF and cold startup of the steam generators would no longer be needed.

Cooling Towers

> The applicant has proposed to eliminate the use of a two-cell cooling tower per power plant unit, which was to be used for auxiliary cooling. These cooling towers will no longer be needed.

HTF Expansion Tank and Vents

> The applicant has proposed to eliminate the use of the HTF ullage tank system for each of the four power block units. This system will no longer be needed.

HTF Piping Systems

> The applicant is proposing to eliminate the piping system. This piping system will no longer be needed.

Gasoline Tank

Due to reduced gasoline usage, gasoline will be obtained from nearby gasoline stations in Blythe. An onsite tank will no longer be necessary.

Operational 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 would use gasoline powered light trucks, equivalent to the Ford F150 model, for facility maintenance, except for panel washing, welding rigs, or other specific activities which require a larger vehicle;
- At the time of their procurement, only new trucks meeting California on-road vehicle emission standards would be purchased for use at the site; and
- In addition, there would not be any changes to staff's previously recommended fugitive dust control condition for operation that includes the same mitigation measures as required during construction, as appropriate.

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 no changes to the operating mitigation already required, with minor modifications to meet current staff recommendations, in staff Conditions of Certification **AQ-SC6** and **AQ-SC7**. There is no change in **SQ-SC6** and **AQ-SC7** has only a change from "mirror" to "panel" to tailor it to PV technology.

Staff is also proposing to delete Condition of Certification **AQ-SC8.** This condition should be deleted because the local air district will not be issuing a determination of compliance for this project, and no stationary sources would be permitted through the local air district.

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

In addition to the direct project emissions of chemically reactive pollutants (NOx, SOx, and VOC) discussed earlier, the proposed project would also have indirect emission reductions associated with the reduction of fossil-fuel fired power plant emissions. This is due to the proposed project displacing the need for fossil-fuel power plant operation, since solar renewable energy facilities would operate on a must-take basis[5]. However, these benefits cannot be quantified as the exact nature and location of such reductions are not known. Therefore, 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 BSPP 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 percent 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 BSPP do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region; however, the region is in attainment with PM2.5 standards and the low level of NOx and SOx emissions from the proposed project would not significantly impact that status.

Impact Summary

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.

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5 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.

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.

PROJECT 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 over time, 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.

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.

Cumulative effects are defined by the Council on Environmental Quality regulations as "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions" (40 CFR 1508.7).

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. Although this proposed modified project would not need a district permit, it would be located in a region where the district must meet the attainment plans, as discussed further below.

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 section 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.

SUMMARY OF PROJECTIONS

The Riverside County portion of the MDAB is designated as attainment for all federal ambient air quality standards and the state CO, NO_2, SO_2 and PM2.5 standards, but is designated as non-attainment for state ozone and PM10 standards.

Ozone

Since a portion of San Bernardino County in the Mojave Desert Air Basin is currently classified as non-attainment for the federal 8-hour ozone standard north and west of the project site, the District is required to prepare and adopt an ozone attainment plan for submittal to the U.S. EPA describing how it will attain the federal 8-hour standard. The District completed this plan in 2008. The project is not specifically subject to the provisions in the federal attainment plan and the site is outside of the non-attainment area.

The District is required to prepare and adopt a state ozone attainment plan for submittal to ARB. The latest state ozone attainment plan was adopted by MDAQMD in 2004. The MDAQMD 2004 Ozone Attainment Plan contains attainment plans for both federal (for areas within San Bernardino County) and state ozone standards. The MDAQMD did not propose to adopt any additional control measures as part of the 2004 Plan. Additionally, while there are no additional control measures for direct ozone precursor reduction as part of the federal 2008 attainment plan, MDAQMD is committed to adopt all applicable Federal Reasonably Available Control Technology (RACT) rules it proposed in 8-hour Reasonably Available Control Technology – State Implementation Plan Analysis (RACT SIP Analysis) in 2006. In addition, the MDAQMD updated and indentified new measures in 2007, which will be adopted through 2014, as the State of California mandates all feasible measures. The RACT rules and other new measures do not impact the BSPP emission sources as proposed.

Particulate Matter

Since a portion of San Bernardino County in the Mojave Desert Air Basin is currently classified as non-attainment for the federal PM10 standards north and west of the project site, the District is required to prepare and adopt an attainment plan for submittal to the U.S. EPA describing how it will achieve attainment with the federal PM10 standards. However, the proposed project site is in Riverside County but located outside of the non-attainment area and is not subject to the provisions in the federal attainment plan. There is no legal requirement for air districts to provide plans to attain the state PM10 standard, so air districts have not developed such plans. Therefore, there are no air quality management plan particulate emission control measures that are applicable to the proposed project.

As a solar power generation facility, the direct air pollutant emissions from power generation are negligible and the emission source would be limited to the maintenance activities such as panel washing. The emissions from the proposed project would be minimal compared to the other power generation facilities, and with staff's recommended construction and operation mitigation measures it is unlikely that the proposed project would have significant impact on particulate matter emissions.

Summary of Conformance with Applicable Air Quality Plans

The applicable air quality plans are not applicable to the Modified Project because the Modified BSPP project would no longer have equipment that requires MDAQMD or federal air quality permits.

Localized Cumulative Impacts

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see the "Operational Modeling Analysis" subsection) which was conducted for the Approved BSPP project, the Modified BSPP 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 six miles of the project boundary. Based on staff's modeling experience, beyond six 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 six miles of the project boundary. 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 two miles away.

Staff has confirmed that there are two projects within a 6-mile border of the Modified BSPP project that could be under construction or have received permits to be built or operate in the foreseeable future. There are other proposed construction projects near the proposed project site such as other proposed renewable energy projects; meanwhile emissions from existing mobile emission sources, such as the I-10 freeway and agriculture are forecast to have long-term emission reductions or significantly reduced emission potentials for most pollutants through improvements in on-road and off-road vehicle engine technology and vehicle turnover, respectively.

These foreseeable projects include The Blythe Airport Solar I Project, McCoy Solar Project and the Blythe Energy Project Transmission Line (see **Cumulative Figure 1** in the **Executive Summary** section). 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 project's cumulative air quality impacts have been mitigated to less than significant, there is no environmental justice issue for air quality.

COMPLIANCE WITH LORS

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 Prevention of Significant Deterioration (PSD) permit from U.S.EPA prior to initiating construction.

The Modified BSPP 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).

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 Energy Commission's affirmative finding for the project.

The Modified BSPP project would not utilize an emergency generator and fire water pump engines and would not be subject to the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines, which limits the types of fuels allowed, establishes maximum emission rates, and establishes recordkeeping requirements.

LOCAL

Mojave District Air Quality Management District (MDAQMD), at the request of the applicants, has deactivated their permit as of the fourth quarter of 2011. The Modified BSPP project will not be required to submit an application for a Determination of Compliance with the MDAQMD because it would not have any permanent emission sources that would require permits under MDAQMD rules.

Regulation IV – Prohibitions

Rule 401 - Visible Emissions

This rule limits visible emissions from emissions sources, including fugitive dust emission sources. Compliance with this rule is expected and applies to the Modified BSPP project's mobile sources only.

NOTEWORTHY PUBLIC BENEFITS

Renewable energy facilities, such as the Modified BSPP project, are needed to meet California's mandated renewable energy goals. While there are no local area air quality public benefits[6] resulting from the proposed project, it would indirectly reduce criteria pollutant emissions within the western U.S. and parts of Canada and Mexico by reducing fossil fuel fired electricity generation.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

There have been no agency or public comments received on air quality that require a technical response.

CONCLUSIONS

Staff makes the following conclusions about the proposed Modified BSPP project:

- The Modified BSPP project would not have the potential to exceed PSD emission levels during direct source operation and the facility is not considered a major stationary source with potential to cause adverse NEPA air quality impacts. However, without adequate fugitive dust mitigation, the Modified BSPP project would have the potential to exceed the PSD emission levels for PM10 during construction, and could cause potential localized exceedances of the PM10 NAAQS during construction. Recommended Conditions of Certification **AQ-SC1** through **AQ-SC4** would adequately mitigate these potentially adverse NEPA impacts.
- If left unmitigated, the Modified BSPP project's construction activities would likely contribute to significant CEQA adverse PM10 and ozone impacts. Staff recommends **AQ-SC1** to **AQ-SC5** to mitigate these 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 Modified BSPP project-direct operational NOx, SOx, PM2.5 and CO emission impacts are not CEQA significant.
- The Modified BSPP 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

[6] Air quality benefits should not be confused with greenhouse gas/climate change benefits, which are discussed in Appendix AIR-1.

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.

MITIGATION MEASURES/ PROPOSED CONDITIONS OF CERTIFICATION

Staff proposes modifications to the air quality Conditions of Certification as shown below. (Note: Deleted text is in strikethrough, new text is bold and underlined.)

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. Any deviation from the AQCMP mitigation measures shall require prior BLM Authorized Officer and CPM notification and approval.

The following fugitive dust mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**.

a. The main access roads through the facility to the power block areas will be either paved or stabilized using soil binders, or equivalent methods, to provide a stabilized surface that is similar for the purposes of dust control to paving, that may or may not include a crushed rock (gravel or similar material with fines removed) top layer, prior to initiating construction in the main power block area, and delivery areas for operations materials (chemicals, replacement parts, etc.) will be paved 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 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. All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading (consistent with **BIO-7**); and after active construction activities shall be stabilized with a non-toxic soil stabilizer or soil weighting agent, or alternative approved soil stabilizing methods, in order to comply with the dust mitigation objectives of Condition of Certification **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.

c. No vehicle shall exceed 10 miles per hour on unpaved areas within the construction site, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

d. Visible speed limit signs shall be posted at the construction site entrances.

e. All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.

f. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

g. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

h. All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM and BLM Authorized Officer.

i. Construction areas adjacent to any paved roadway below the grade of the surrounding construction area or otherwise directly impacted by sediment from site drainage shall be provided with sandbags or other equivalently effective measures to prevent run-off to roadways, or other similar run-off control measures as specified in the Storm Water Pollution Prevention Plan (SWPPP), only when such SWPPP measures are necessary so that this condition does not conflict with the requirements of the SWPPP.

j. All paved roads within the construction site shall be swept daily or as needed (less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

k. At least the first 500 feet of any paved public roadway exiting the construction site or exiting other unpaved roads en route from the construction site or construction staging areas shall be swept as needed (less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff resulting from the construction site activities is visible on the public paved roadways.

l. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.

m. All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.

n. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

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

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 the additional mitigation measures described in the verification below and how they will be implemented to meet these fugitive dust control performance standards. The AQCMP shall include the following additional mitigation measure implementation procedures that will be used to ensure that the performance standards of this condition are met:

The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that visible dust plumes as defined above 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

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the ~~Monthly Compliance Report~~ **MCR**, a ~~construction mitigation report~~ **table** that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related **combustion** 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~~ **requires** prior CPM notification and approval.

All ~~diesel fueled engines~~ **off-road diesel construction equipment with a rating of 50 hp or greater** used in the construction of ~~the~~ **this** facility shall ~~have clearly visible tags issued~~ **be powered** by the ~~onsite AQCMM showing that the engine meets the Conditions set forth herein.~~ **cleanest engines reasonably and locally available that also comply with the** California ~~Emissions Standards~~ **Air Resources Board's (ARB's) Regulation** for **In-Use** Off-Road ~~Compression Ignition Engines, as specified in~~ **Diesel Fleets** (California Code of **Federal** Regulations Title 13, ~~section 2423(b)(1), unless a good faith effort to~~ **Article 4.8, Chapter 9, Section 2449 et. Seq.) and shall**

be included in the ~~satisfaction of~~ **Air Quality Construction Mitigation Plan (AQCMP) required by AQ-SC2. The AQCMP measures shall include** the ~~CPM that is certified by onsite AQCMM demonstrated that such~~ **cleanest engines reasonably and locally available** ~~is not~~ **in each case**:

a. All off-road vehicles with compression ignition engines shall comply with the California Air Resources Board's (ARB's) Regulation for ~~a particular item of equipment.~~ In ~~the event that a Tier 3 engine is not~~ **In-Use Off-Road Diesel Fleets**.

b. To meet the highest level of emissions reduction available for ~~and off-road~~ **the engine family of the equipment** ~~larger than 100 hp, that,~~ **each piece of diesel-powered equipment shall be powered by a Tier 4 engine (without add-on controls) or Tier 4i engine (without add-on controls), or a Tier 3 engine with a post-combustion retrofit device verified for use on the particular engine powering the device by the ARB or the US EPA. For PM, the retrofit device shall be a particulate filter if verified, or a flow-through filter, or at least an oxidation catalyst. For NOx, the device shall meet the latest Mark level verified to be available (as of January 2012, none meet this NOx requirement).**

c. For diesel powered equipment where the requirements of Part "b" cannot be met, the equipment shall be equipped with a Tier **3 engine without retrofit control devices or with a Tier** 2 **or lower Tier** engine ~~or an engine that is equipped with~~ **using** retrofit controls **verified by ARB or US EPA as the best available control device** to reduce exhaust emissions of **PM and** 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~~ **can be considered** "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 use of the retrofit device would unduly restrict the vision of the operator such that the vehicle would be unsafe to operate because the device would impair the**

operator's vision to the front, sides, or rear of the vehicle, or

3. The construction equipment is intended to be on site for 10 **work** days or less.

d. The CPM may grant relief from ~~this~~ **a** requirement **in Part "b" or "c"** if the AQCMM can demonstrate a good faith effort to comply with ~~this~~ **the** requirement and that compliance is not practical.

e. The use of a retrofit control device may be terminated immediately provided that**: (1)** the CPM is informed within 10 working days ~~of the~~ **following such** termination ~~and that~~**; (2)** a replacement for the **construction** equipment ~~item~~ in question ~~meeting~~**, which meets** the ~~controls~~ **level of control** required ~~in item "b"~~, occurs within 10 **work** days ~~of~~ **following such** termination of the use (if the equipment would be needed to continue working at this site for more than 15 **work** days after the use of the retrofit control device is terminated)**; and (3)** 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 **exhaust** 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.

f. ~~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. **Each engine shall be in its original configuration and the equipment or engine must be replaced if it exceeds the manufacturer's approved oil consumption rate.**

g. ~~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.~~ Construction equipment will employ electric motors when feasible.

h. **<u>If the requirements detailed above cannot be met, the AQCMM shall certify that a good faith effort was made to meet these requirements and this determination must be approved by the CPM.</u>**

i. **<u>All off-road 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.</u>**

<u>Verification:</u> The AQCMM shall include in the ~~Monthly Compliance Report~~ <u>MCR</u> the following to demonstrate control of diesel construction-related emissions:

A. A summary of all actions taken to control diesel construction related emissions;

B. **<u>A table listing</u>** list of all heavy equipment used on site during that month, ~~including~~ **<u>showing the tier level of each engine and the basis for alternative compliance with this condition for each engine not meeting Part "b" requirements. The MCR shall identify</u>** the owner of ~~that~~ **<u>the</u>** equipment and **<u>contain</u>** a letter from each owner indicating that **<u>the</u>** 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~~ **<u>condition</u>**.

AQ-SC6 The project owner, when obtaining dedicated on-road or off-road vehicles for panel 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.

<u>Verification:</u> 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 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 or local air permit. The project owner shall submit to the CPM any modification to any federal or local air permit proposed by the District or U.S. Environmental Protection Agency (U.S. EPA), and any revised federal or local 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 or local 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 federal or local air permits to the CPM within 15 days of receipt.~~

DISTRICT CONDITIONS

Mojave District Air Quality Management District (MDAQMD), at the request of the applicants, has deactivated the determination of compliance application as of the fourth quarter of 2011. The Modified BSPP project will not be required to submit an application for a Determination of Compliance with the MDAQMD because it will not have any permanent emission sources that would require permits under MDAQMD rules. Therefore staff recommends the deletion of all Air Quality Conditions of Certification **AQ-1** through **AQ-60**.

~~Auxiliary Boiler Conditions~~

~~Equipment Description~~

~~Four - 35 MMBtu/hr Natural Gas Fired Auxiliary Boiler, Application Number: 0010748, 0010755, 0010762 and 0010769.~~

~~AQ-1~~ ~~Operation of this equipment shall be conducted in compliance 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 by representatives of the District, ARB, and the Energy Commission.~~

~~AQ-2~~ ~~This equipment shall be exclusively fueled with natural gas and shall be operated and maintained in strict accord with the recommendations of its manufacturer or supplier and/or sound engineering principles.~~

~~Verification:~~ ~~The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.~~

~~AQ-3~~ ~~This equipment is subject to the federal NSPS codified at 40 CFR Part 60, Subparts A (General Provisions) and Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units).~~

~~Verification:~~ ~~The project owner shall complete and submit to the CPM a compliance plan that provides a list of the 40 CFR 60 Subpart A and Dc plans, tests, and recordkeeping requirements and their compliance schedule dates as applicable for the boilers at least 30 days prior to first fire of the boiler or earlier as necessary for compliance with Subpart A and Dc.~~

~~AQ-4~~ ~~Emissions from this equipment shall not exceed the following hourly emission limits at any firing rate, verified by fuel use and compliance tests:~~

~~a. NOx as~~ $\cancel{NO_2}$~~:~~

~~1. 0.389 lb/hr operating at 100% load (based on 9.0 ppmvd corrected to 3%~~ $\cancel{O_2}$ ~~and averaged over one hour)~~

~~2. 0.097 lb/hr operating at 25% load (based on 9.0 ppmvd corrected to 3% O_2 and averaged over one hour)~~

~~b. CO:~~

~~1. 1.322 lb/hr operating at 100% load (based on 50 ppmvd corrected to 3% O_2 and averaged over one hour)~~

~~2. 0.331 operating at 25% load (based on 50 ppmvd corrected to 3% O_2 and averaged over one hour)~~

~~c. VOC as CH_4:~~

~~1. 0.175 lb/hr operating at 100% load~~

~~2. 0.044 lb/hr operating at 25% load~~

~~d. SOx as SO_2:~~

~~1. 0.010 lb/hr operating at 100% load~~

~~2. 0.002 lb/hr operating at 25% load~~

~~e. PM10:~~

~~1. 0.035 lb/hr operating at 100% load~~

~~2. 0.088 lb/hr operating at 25% load~~

~~**Verification:** As part of the Annual Compliance Report, the project owner shall include information demonstrating compliance with boiler operating emission rates.~~

~~**AQ-5** This equipment shall be operated only on PUC pipeline quality natural gas and shall be equipped with a non-resettable fuel meter. Fuel used shall not exceed:~~

~~a. 57,499,425 cubic feet of natural gas per rolling twelve months; and~~

~~b. 524,995 cubic feet of natural gas per calendar day.~~

~~**Verification:** The project owner shall submit to the CPM the boiler fuel use data demonstrating compliance with this condition as part of the Annual Operation Report.~~

~~**AQ-6** Operation of this equipment shall not exceed:~~

~~a. 15 hours per calendar day and 4500 hours per rolling twelve months at 25% load; and~~

~~b. 12 hours per calendar day and 600 hours per rolling twelve months at 100% load.~~

~~**Verification:** The project owner shall submit to the CPM the boiler fuel use data demonstrating compliance with this condition as part of the Annual Operation Report.~~

~~**AQ-7** The project owner shall maintain an operations log for this equipment on-site and current for a minimum of five (5) years, and said log shall be provided to District personnel on request. The operations log shall include the following information at a minimum:~~

~~a. Total operation time (hours/day, hours/month and cumulative hours/rolling twelve months);~~

~~b. Fuel use (daily, monthly and cumulative hour/rolling twelve months);~~

~~c. Maximum hourly, maximum daily, total quarterly, and total calendar year emissions of NOx, CO, PM10, VOC and SOx (including calculation protocol); and,~~

~~d. Any permanent changes made to the equipment that would affect air pollutant emissions, and indicate when changes were made.~~

~~**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-8** Records of fuel supplier certifications of fuel sulfur content shall be maintained to demonstrate compliance with the sulfur dioxide and particulate matter emissions limits.~~

~~**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-9** The project owner shall continuously monitor fuel flow rate and flue gas oxygen level.~~

~~**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-10** The project owner shall perform an initial compliance test on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual within 180 days of initial start up. The test report shall be submitted to the District within 6 weeks of performance of the test. The initial compliance test shall be for all items listed in condition **AQ-4** above, in addition to:~~

~~a. NO_x as NO_2 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 19 and 20).~~

~~b. CO in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Method 10).~~

~~c. PM_{10} in mg/m^3 at 3% oxygen and lb/hr (measured per USEPA Reference Methods 5 and 202 or CARB Method 5).~~

~~d. Opacity (measured per USEPA reference Method 9).~~

~~e. Flue gas flow rate in dscf per minute.~~

~~f. VOC as CH_4 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 25A and 18).~~

~~g. SOx as SO_2 in ppmvd at 3% oxygen calculated based on fuel supplier provided information.~~

~~**Verification:** The project owner shall notify the District and the CPM within 15 working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within the timeframe required by this condition.~~

~~**AQ-11** The project owner shall perform annual compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District no later than six weeks prior to the expiration date of this permit. The following compliance tests are required:~~

~~a. NO_x as NO_2 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 19 and 20).~~

~~b. CO in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Method 10).~~

~~c. Flue gas flow rate in dscf per minute.~~

~~d. Opacity (measured per USEPA reference Method 9).~~

~~**Verification:** The project owner shall notify the District and the CPM within 15 working days before the execution of the initial compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 6 weeks of the date of the tests.~~

~~**AQ-12** This unit shall be tuned annually in accordance with the tuning procedure referenced in District Rule 1157 Section (I) or a modification of the tuning procedure described in Section (I) as approved by the District, or the permit unit manufacturer's specified tune-up procedure, by a technician that is qualified, to the satisfaction of the District, to perform a tune-up;~~

~~**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.~~

~~**Ullage System Conditions**~~

~~***Equipment Description***~~

~~Four - HTF ullage expansion tanks, Application Number: 0010750, 0010757, 0010764 and 0010771.~~

~~**AQ-13** Operation of this equipment shall be conducted in compliance 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 by representatives of the District, ARB, and the Energy Commission.~~

~~**AQ-14** This equipment shall be operated and maintained in strict accord with the recommendations of its manufacturer or supplier and/or sound engineering principles.~~

~~**Verification:** The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.~~

~~**AQ-15** This system shall only store HTF.~~

~~**Verification:** The project owner shall make the site available for inspection of HTF piping Inspection and Maintenance Program records (**AQ-17**) and HTF system equipment by representatives of the District, ARB, and the Energy Commission.~~

~~**AQ-16** This system shall be operated at all times with the carbon adsorption system under District permit [To be Determined].~~

~~**Verification:** The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.~~

~~**AQ-17** The project owner shall establish an inspection and maintenance program to determine, repair, and log leaks in HTF piping network and expansion tanks. Inspection and maintenance program and documentation shall be available to District staff upon request.~~

~~a. All pumps, compressors and pressure relief devices (pressure relief valves or rupture disks) shall be electronically, audio, or visually inspected once every operating day.~~

~~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 5 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 this Authority to Construct (ATC)/Permit to Operate (PTO).~~

~~h. The project owner shall place an adequate number of isolation valves in the Heat Transfer Fluid (HTF) pipe loops so as to be able to isolate a solar panel collector loop in the event of a leak of fluid. These valves shall be actuated automatically, manually, and remotely, or locally as determined~~

~~during detailed engineering design. The detailed engineering design drawings showing the number, location, and type of isolation valves shall be provided to the District for review and approval prior to the commencement of the solar array construction.~~

~~**Verification:** 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. As part of the Annual Compliance Report, the project owner shall provide the quantity of used HTF fluid removed from the system and the amount of new HTF fluid added to the system each year. 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-18** If current non-criteria substances become regulated as toxic or hazardous substances and are used in this equipment, the project owner shall submit to the District a plan demonstrating how compliance will be achieved and maintained with such regulations.~~

~~**Verification:** The project owner shall a copy of the plan prepared to comply with this condition, if and when necessary, to the CPM for review within 30 days of submittal to the District.~~

~~Carbon Adsorption System Conditions~~

~~*Equipment Description*~~

~~Four - carbon adsorption systems, one serving each ullage system, Application Number: 0010751, 0010758, 0010765 and 0010772.~~

~~**AQ-19** 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 by representatives of the District, ARB, and the Energy Commission.~~

~~**AQ-20** This carbon adsorption system shall provide 98% control efficiency of VOC emissions vented from the HTF ullage system under District Permit [to be determined].~~

~~**Verification:** The project owner shall provide the District and CPM carbon adsorption manufacturer guarantee data showing compliance with this condition at least 30 days prior to the installation of the carbon adsorption systems.~~

~~**AQ-21** The project owner shall prepare and submit a monitoring and change-out plan for the carbon adsorptions system which ensures that the system is operating at optimal control efficiency at all times for District approval prior to start up.~~

~~**Verification:** The project owner shall submit a monitoring and change-out plan for the carbon adsorptions system for District approval and CPM review prior to facility start-up.~~

~~**AQ-22** This equipment shall be properly maintained and kept in good operating condition at all times.~~

~~**Verification:** The project owner shall submit maintenance reports for carbon adsorption system to the CPM as part of Annual Compliance Report.~~

~~**AQ-23** This equipment must be in use and operating properly at all times the HTF ullage system is venting.~~

~~**Verification:** The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.~~

~~**AQ-24** Total emissions of VOC to the atmosphere shall not exceed 1.5 lbs/day and 300 lbs/year calculated based on the most recent monitoring results.~~

~~**Verification:** As part of the Annual Compliance Report the project owner shall include information on operating emission rates to demonstrate compliance with this condition.~~

~~**AQ-25** During operation, the project owner shall monitor VOC measured at an outlet from the carbon beds. Sampling is to be performed on a weekly basis. Samples shall be analyzed pursuant to USEPA Test Method 25 – Gaseous Non-methane Organic Emissions. Initial test shall be submitted to the District within 180 days after startup.~~

~~**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.~~

~~**AQ-26** FID shall be considered invalid if not calibrated on the day of required use.~~

~~**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-27** The project owner shall maintain current and on-site for the duration of the project a log of the weekly test results, which shall be provided to District personnel upon request, with date and time the monitoring was conducted.~~

~~**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-28** Prior to January 31 of each new year, the project owner of this unit shall submit to the District a summary report of all VOC emissions (as hexane).~~

~~**Verification:** The project owner shall provide a summary of the HTF vent system benzene and VOC emissions to the CPM as part of the Annual Compliance Report and to the District by January 31 each year.~~

~~Cooling Tower Conditions~~

~~*Equipment Description*~~

~~Four Cooling Towers, Application Number: 0010752, 0010759, 0010766 and 0010773.~~

~~**AQ-29** Operation of this equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below.~~

~~**<u>Verification:</u>** 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-30** This equipment shall be operated and maintained in strict accord with the recommendations of its manufacturer or supplier and/or sound engineering principles.~~

~~**<u>Verification:</u>** 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-31** The drift rate shall not exceed 0.0005 percent with a maximum circulation rate of 6,034 gallons per minute. The maximum hourly PM10 emission rate shall not exceed 0.061 pounds per hour, as calculated per the written District-approved protocol.~~

~~**<u>Verification:</u>** The manufacturer guarantee data for the drift eliminator, showing compliance with this condition, shall be provided to the CPM and the District 30 days prior to cooling tower operation. As part of the Annual Compliance Report the project owner shall include information on operating emission rates to demonstrate compliance with this condition.~~

~~**AQ-32** The operator shall perform weekly tests of the blow-down water total dissolved solids (TDS). The TDS shall not exceed 2,000 ppmv based on an arithmetic average of all TDS measurements conducted each month. The operator shall maintain a log which contains the date and result of each blow-down water test in TDS ppm, and the resulting mass emission rate. This log shall be maintained on site for a minimum of five (5) years and shall be provided to District personnel on request.~~

~~**<u>Verification:</u>** The cooling tower recirculation water TDS content test results shall be provided to representatives of the District, ARB, and the Energy Commission upon request.~~

~~**AQ-33** The operator shall conduct all required cooling tower water tests in accordance with a District-approved test and emissions calculation protocol. Thirty (30) days prior to the first such test the operator shall provide a written test and emissions calculation protocol for District review and approval.~~

~~**<u>Verification:</u>** The project owner shall provide an emissions calculation and water sample testing protocol to the District for approval and CPM for review at least 30 days prior to the first cooling tower water test.~~

~~**AQ-34** A maintenance procedure shall be established that states how often and what procedures will be used to ensure the integrity of the drift eliminators. This procedure is to be kept onsite and available to District personnel on request.~~

~~**<u>Verification:</u>** The project owner shall make available at request the written drift eliminator maintenance procedures for inspection by representatives of the District, ARB, and the Energy Commission.~~

~~**Emergency Generator Conditions**~~

~~***Equipment Description***~~

~~Four – 2,922 hp emergency IC engine each driving a generator, Application Number: 0010753, 0010760, 0010767 and 0010774.~~

~~**AQ-35**~~ ~~This equipment shall be installed, operated and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.~~

~~**Verification:**~~ ~~The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission~~

~~**AQ-36**~~ ~~This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15 ppm) on a weight per weight basis per CARB Diesel or equivalent requirements.~~

~~**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-37**~~ ~~A non-resettable hour meter with a minimum display capability of 9,999 hours shall be installed and maintained on this unit to indicate elapsed engine operating time. (Title 17 CCR §93115.10(e)(1)).~~

~~**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 timer.~~

~~**AQ-38**~~ ~~This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than one hour in any twenty four hour period and 20 hours per year for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the one hour daily or 20 hour per year limit.~~

~~**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-39**~~ ~~This facility shall not perform testing of more than one internal combustion engine at any one time and no more than two internal combustion engines in any twenty-four hour period.~~

~~**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-40**~~ ~~The project owner shall maintain a operations log for this unit current and on-site, either at the engine location or at a on-site location, for a minimum of five (5) years, and for another year where it can be made available to the District~~

~~staff within 5 working days from the District's request, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:~~

~~a. Date of each use and duration of each use (in hours);~~

~~b. Reason for use (testing & maintenance, emergency, required emission testing);~~

~~c. Calendar year operation in terms of fuel consumption (in gallons) and total hours; and,~~

~~d. Fuel sulfur concentration (the project owner may use the supplier's certification of sulfur content if it is maintained as part of this log).~~

~~**Verification:**~~ ~~The project owner shall submit records required by this condition that demonstrating compliance with the sulfur content and engine use limitations of conditions **AQ-36, AQ-38,** and **AQ-39** 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 by representatives of the District, ARB, and the Energy Commission.~~

~~**AQ-41**~~ ~~This unit is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these conditions and the ATCM, the more stringent shall govern.~~

~~**Verification:**~~ ~~Not necessary.~~

~~**AQ-42**~~ ~~This unit is subject to the requirements of the Federal National Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines (40 CFR Part 60 Subpart IIII).~~

~~**Verification:**~~ ~~The project owner shall submit the engine specifications at least 30 days prior to purchasing the engines for review and approval demonstrating that the engines meet NSPS and ARB ATCM emission limit requirements at the time of engine purchase.~~

~~Emergency Fire Suppression Water Pump Engine Conditions~~

~~*Equipment Description*~~

~~Four – 300 hp emergency IC engine each driving a fire suppression water pump, Application Number: 0010754, 0010761, 0010768 and 0010775.~~

~~**AQ-43**~~ ~~This equipment shall be installed, operated and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.~~

~~**Verification:** The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission~~

~~**AQ-44** This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15 ppm) on a weight per weight basis per CARB Diesel or equivalent requirements.~~

~~**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-45** A non-resettable hour meter with a minimum display capability of 9,999 hours shall be installed and maintained on this unit to indicate elapsed engine operating time. (Title 17 CCR §93115.10(e)(1)).~~

~~**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 timer.~~

~~**AQ-46** This unit shall be limited to use for emergency power, defined as in response to a fire or due to low fire water pressure. In addition, this unit shall be operated no more than one hour in any twenty four hour period and 50 hours per year for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the one hour daily limit or 20 hour per year limit. The one hour daily or 50 hour limit can be exceeded when the emergency fire pump assembly is driven directly by a stationary diesel fueled IC engine operated per and in accord with the National Fire Protection Association (NFPA) 25 - "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 1998 edition. This requirement includes usage during emergencies. {Title 17 CCR 93115.3(n)}~~

~~**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-47** This facility shall not perform testing of more than one internal combustion engine at any one time and no more than two internal combustion engines in any twenty four hour period.~~

~~**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-48** The project owner shall maintain an operations log for this unit current and on-site, either at the engine location or at a on-site location, for a minimum of five (5) years, and for another year where it can be made available to the District staff within 5 working days from the District's request, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:~~

~~a. Date of each use and duration of each use (in hours);~~

b. ~~Reason for use (testing & maintenance, emergency, required emission testing);~~

c. ~~Calendar year operation in terms of fuel consumption (in gallons) and total hours; and,~~

d. ~~Fuel sulfur concentration (the project owner may use the supplier's certification of sulfur content if it is maintained as part of this log).~~

~~**Verification:** The project owner shall submit records required by this condition that demonstrating compliance with the sulfur content and engine use limitations of conditions **AQ-44, AQ-46,** and **AQ-47** 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 by representatives of the District, ARB, and the Energy Commission.~~

~~**AQ-49** This unit is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these conditions and the ATCM, the more stringent shall govern.~~

~~**Verification:** Not necessary.~~

~~**AQ-50** This unit is subject to the requirements of the Federal National Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines (40 CFR Part 60 Subpart IIII).~~

~~**Verification:** The project owner shall submit the engine specifications at least 30 days prior to purchasing the engines for review and approval demonstrating that the engines meet NSPS and ARB ATCM emission limit requirements at the time of engine purchase.~~

~~Non-Retail Gasoline Dispensing Facility Conditions~~

~~Equipment Description~~

~~One – above ground gasoline storage tank and fuel receiving and dispensing equipment, Application Number: TBD.~~

~~**AQ-51** The toll-free telephone number that must be posted is 1-800-635-4617.~~

~~**Verification:** The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission~~

~~**AQ-52** The project owner shall maintain a log of all inspections, repairs, and maintenance on equipment subject to Rule 461. Such logs or records shall be maintained at the facility for at least two (2) years and available to the District upon request. Records of Maintenance, Tests, Inspections, and Test Failures shall be maintained and available to District personnel upon request; record form shall be similar to the Maintenance Record form indicated in EO VR-401-A, Figure 2N.~~

~~**<u>Verification:</u>** 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-53** Any modifications or changes to the piping or control fitting of the vapor recovery system require prior approval from the District.~~

~~**<u>Verification:</u>** The project owner shall make the site available for inspection of maintenance records by representatives of the District, ARB, and the Energy Commission.~~

~~**AQ-54** Pursuant to EO VR-401-A, vapor vent pipes are to be equipped with Husky 5885 pressure relief valves or as otherwise allowed by EO.~~

~~**<u>Verification:</u>** The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission~~

~~**AQ-55** The project owner shall perform the following tests within 60 days of construction completion and annually thereafter in accord with the following test procedures:~~

~~a. Determination of Static Pressure Performance of Vapor Recovery Systems at Gasoline Dispensing Facilities with Aboveground Storage Tanks shall be conducted per EO VR-401-A Exhibit 4;~~

~~b. Phase I Adapters, Emergency Vents, Spill Container Drain Valve, Dedicated gauging port with drop tube and tank components, all connections, and fitting shall NOT have any detectable leaks; test methods shall be per EO VR-401-A Table 2-1, and~~

~~c. Liquid Removal Test (if applicable) per TP-201.6, and~~

~~Summary of Test Data shall be documented on a Form similar to EO VR-401-A From 1.~~

~~The District shall be notified a minimum of 10 days prior to performing the required tests with the final results submitted to the District within 30 days of completion of the tests.~~

~~The District shall receive passing test reports no later than six (6) weeks prior to the expiration date of this permit.~~

~~**<u>Verification:</u>** The project owner shall make the site available for inspection of equipment and the results for the tests required by this condition by representatives of the District, ARB, and the Energy Commission.~~

~~**AQ-56** Pursuant to California Health and Safety Code sections 39600, 39601 and 41954, this aboveground tank shall be installed and maintained in accordance with Executive Order (EO) VR-401-A for EVR Phase I, and Standing Loss requirements.~~

~~http://www.arb.ca.gov/vapor/eos/eo-vr401/eo-vr401a/eo-401a.pdf~~

~~Additionally, Phase II Vapor Recovery System shall be installed and maintained per G-70-116-F with the exception that hanging hardware shall be EVR Balance Phase II type hanging hardware (VST or other CARB Approved EVR Phase II Hardware).~~

~~Verification:~~ ~~The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.~~

~~AQ-57~~ ~~Pursuant to EO VR-401-A; Maintenance and repair of system components, including removal and installation of such components in the course of any required tests, shall be performed by OPW Certified Technicians.~~

~~Verification:~~ ~~The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.~~

~~AQ-58~~ ~~Pursuant to EO VR-401-A, Maintenance Intervals for OPW; Tank Gauge Components; Dust Caps Emergency Vents; Phase I Product and Vapor Adapters, and Spill Container Drain Valve, shall be conducted by an OPW trained technician annually.~~

~~Verification:~~ ~~The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.~~

~~AQ-59~~ ~~The annual throughput of gasoline shall not exceed 600,000 gallons per year. Throughput Records shall be kept on site and available to District personnel upon request. Before this annual throughput can be increased the facility may be required to submit to the District a site specific Health Risk Assessment in accord with a District approved plan. In addition public notice and/or comment period may be required.~~

~~Verification:~~ ~~The project owner shall provide gasoline throughput records to demonstrate compliance with this condition in the Annual Compliance Report.~~

~~AQ-60~~ ~~The project owner shall; install, maintain, and operate EVR Phase I in compliance with CARB Executive Order VR-401-A, and Phase II vapor recovery in accordance with G-70-116-F. In the event of conflict between these permit conditions and/or the referenced EO's the more stringent requirements shall govern.~~

Verification: ~~The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.~~

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ACRONYMS

AAQS	Ambient Air Quality Standard
AERMOD	ARMS/EPA Regulatory Model
AFC	Application for Certification
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
AQMD	Air Quality Management District
ARB	California Air Resources Board
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
bhp	brake horsepower
BLM	Bureau of Land Management
BSPP	Blythe Solar Power Project
CalEPA	California Environmental Protection Agency
CCR	California Code of Regulations
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CPM	(CEC) Compliance Project Manager
DPM	Diesel Particulate Matter
EIS	Environmental Impact Statement

FDOC	Final Determination Of Compliance
GHG	Greenhouse Gas
hp	horsepower
HSC	Health and Safety Code
HTF	Heat Transfer Fluid
kV	Kilovolt
lbs	Pounds
LORS	Laws, Ordinances, Regulations and Standards
μg/m3	micrograms per cubic meter
mg/m3	milligrams per cubic meter
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave District Air Quality Management District
MW	Megawatt (1,000,000 Watts)
MWh	Megawatt-hour
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Protection Act
NMHC	non-methane-hydrocarbons
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
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
PSD	Prevention of Significant Deterioration
PTO	Permit to Operate
RACT	Reasonably Available Control Technology
SA	Staff Assessment (this document)
SCE	Southern California Edison
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_4	Sulfate
SOx	Oxides of Sulfur
SWPPP	Storm Water Pollution Prevention Plan
tpy	tons per year
U.S.EPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

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APPENDIX AIR-1 - GREENHOUSE GAS EMISSIONS

Jacquelyn Leyva Record

SUMMARY OF CONCLUSIONS

The Blythe Solar Power Project (BSPP) project owner is proposing to replace the parabolic trough solar collection system and associated heat transfer fluid (HTF) system previously approved by the California Energy Commission (Energy Commission) and to use for the Photovoltaic (PV) technology instead.

The Modified BSPP project includes replacing the solar thermal technology completely with PV generating technology and reducing the physical size of the project. Linear access to the site would be the same as the Approved BSPP, and the Modified BSPP would continue to interconnect to the regional transmission grid via the same proposed gen-tie line to Southern California Edison's (SCE's) Colorado River Substation (CRS), which is currently under construction.

NextEra Blythe Solar proposes to develop the Modified BSPP project in four operational phases designed to generate a total of approximately 485 MW of electricity. The first three units (phases) would consist of approximately 125 MW alternating current (AC) each. The fourth unit would generate approximately 110 MW AC. The transmission corridor is located in the center of the site with the exact location to be determined during final design.

While BSPP would emit some Greenhouse Gas (GHG) emissions, the contribution of the Modified BSPP project 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 the Modified BSPP project, affects all other power plants in the interconnected system. The Modified BSPP project would be a "must-take" facility and its operation would affect the overall electricity system operation and GHG emissions in several ways. The Modified BSPP project:

- Would displace higher GHG-emitting electricity generation. Because the project's GHG emissions per megawatt-hour (MWh) would be largely based upon renewable solar generation, GHG emissions would be much lower than power plants that the project would displace. Therefore, the addition of the Modified BSPP project would contribute to a reduction of California and overall Western Electricity Coordinating Council system GHG[7] emissions and GHG emission rate average and would be part of California's programmatic approach to meeting GHG emissions reduction goals.
- Would facilitate to some degree the replacement high GHG emitting (e.g., out-of-state coal) electricity generation that must be phased out in conformance with the State's Emissions Performance Standard.

[7] Fuel-use closely correlates to the efficiency of and carbon dioxide (CO_2) emissions even from renewable power plants.

- Could facilitate to some extent the replacement of generation provided by aging fossil-fired power plants that use once-through cooling (OTC).

These system impacts would result in a net reduction in GHG emissions across the electricity system, while providing energy and capacity to California. Thus, staff concludes that the Modified BSPP 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 California Environmental Quality Act (CEQA) significant.

Staff concludes that the short-term minor emission of GHGs during construction that are necessary to create this new, very 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.

The Modified BSPP project, as a solar project with a nightly shutdown, would operate significantly less than a 60 percent capacity factor and therefore would not be subject to the requirements of Senate Bill (SB) 1368 (Greenhouse Gases Emission Performance Standard; Title 20, California Code of Regulations, section 2900 et. seq.). Furthermore, the Modified BSPP project would not have stationary sources so it would easily comply with the requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard.

INTRODUCTION

The **AIR QUALITY** section evaluates the proposed BSPP for criteria pollutants and this appendix evaluates the proposed BSPP for GHG emissions.

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 GHG emissions. Staff’s analysis examines the Modified BSPP project’s compliance with these requirements.

AIR QUALITY GHG ANALYSIS

California is actively pursuing policies to reduce GHG emissions that include adding low-GHG emitting renewable electricity generation resources such as the Modified BSPP project to the system. The GHGs evaluated in this analysis include carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFC), and perflurocarbons (PFC). CO_2 emissions are far and away the most common of these emissions; as a result, even though the other GHGs may have a greater impact on climate change on a per-unit basis due to their greater global warming potential as described more fully below, GHG emissions are often “normalized” in terms of metric tons of CO_2-equivalent (MTCO2E) for simplicity. Global warming potential (GWP) is a relative measure, compared to carbon dioxide, of a compound’s ability to warm the planet, taking into account each compound’s expected residence time in the atmosphere. By convention, carbon dioxide is assigned a global warming potential of one. In comparison, for example methane has a GWP of 21, which means that it has a global warming effect 21 times greater than carbon dioxide on an equal-mass basis. The carbon dioxide equivalent (CO2E) for a source is obtained by multiplying each GHG by its GWP and then adding the results together to obtain a single, combined emission rate representing all GHGs in terms of CO2E.

GHG emissions are not included in the class of pollutants traditionally called “criteria pollutants.” Since the impact of the GHG emissions from a power plant’s operation has global rather than local effects, those impacts should be assessed not only by analysis of the plant’s emissions, but also in the context of the operation of the entire electricity system of which the plant is an integrated part. Furthermore, the impact of the GHG emissions from a power plant’s operation should be analyzed in the context of applicable GHG laws and policies, especially Assembly Bill (AB) 32, California’s Global Warming Solutions Act of 2006.

GLOBAL CLIMATE CHANGE AND ELECTRICITY PRODUCTION

Worldwide, with the exception of 1998, over the past 132-year record the nine warmest years all have occurred since 2000, with the two hottest years on record being 2010 and 2005 (NASA 2013). According to “The Future Is Now: An Update on Climate Change Science Impacts and Response Options for California,” an Energy Commission document, the American West is heating up faster than other regions of the United States (CEC 2009e). The California Climate Change Center (CCCC) reports that, by the end of this century, average global surface temperatures could rise by 4.7°F to 10.5°F due to increased GHG emissions.

The accumulation of GHGs in the atmosphere regulates the earth’s temperature. Without natural greenhouse gases, the earth’s surface would be approximately 61°F (34°C) cooler (CalEPA 2006); however, emissions from fossil fuel combustion for activities such as electricity production and vehicular transportation have elevated the concentration of GHGs in the atmosphere above natural levels. California Air Resources Board (ARB) estimated that the mobile source sector accounted for approximately 38 percent of the GHG emissions generated in California in 2009, while the electricity generating sector accounted for approximately 23 percent of the 2009 California GHG emissions inventory with just more than half of that from in-state generation sources (ARB 2011).

The Fourth U.S. Climate Action Report concluded, in assessing current trends, that CO_2 emissions increased by 20 percent from 1990 to 2004, while methane and nitrous oxide emissions decreased by 10 percent and 2 percent, respectively. The Intergovernmental Panel on Climate Change (IPCC) constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. It concluded that stabilization of GHGs at 450 ppm carbon dioxide equivalent concentration is required to keep the global mean warming increase below 3.8°F (2.1°C) from year 2000 base line levels (IPCC 2007a).

GHGs differ from criteria pollutants in that GHG emissions from a specific project do not cause direct adverse localized human health effects. Rather, the direct environmental effect of GHG emissions is the cumulative effect of an overall increase in global temperatures, which in turn has numerous indirect effects on the environment and humans. The impacts of climate change include potential physical, economic and social effects. These effects could include inundation of settled areas near the coast from rises in sea level associated with melting of land-based glacial ice sheets, exposure to more frequent and powerful climate events, and changes in suitability of certain areas for agriculture, reduction in Arctic sea ice, thawing permafrost, later freezing and earlier break-up of ice on rivers and lakes, a lengthened growing season, shifts in plant and animal ranges, earlier flowering of trees, and a substantial reduction in winter snowpack (IPCC 2007b). For example, current estimates include a 70 to 90 percent reduction in snow pack in the Sierra Nevada mountain range. Current data suggest that in the next 25 years, in every season of the year, California could experience unprecedented heat, longer and more extreme heat waves, greater intensity and frequency of heat waves, and longer dry periods. More specifically, the CCCC predicted that California could witness the following events (CCCC 2006):

- Temperature rises between 3 and 10.5 ºF
- 6 to 20 inches or greater rise in sea level
- 2 to 4 times as many heat-wave days in major urban centers
- 2 to 6 times as many heat-related deaths in major urban centers
- 1 to 1.5 times more critically dry years
- Losses to mountaintop snowpack and water supply (e.g., according to the CCCC, Sierra Nevada snowpack could be reduced by as much as 70 to 90 percent by 2100 [CEC 2009e])
- 25 to 85 percent increase in days conducive to ozone formation
- 3 to 20 percent increase in electricity demand
- 10 to 55 percent increase in the risk of wildfires

In 1896 Nobel Prize winning Swedish physical chemist, Svante Arrhenius, published the first paper on the contribution of carbon-dioxide to climate change which noted fossil fuel burning as a source of CO2. [8]

In the nearly 120 years since Dr. Arrhenius' work, considerable research has resulted in the 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 GHGs, 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).

[8] http://www.globalwarmingart.com/images/1/18/Arrhenius.pdf Philosophical Magazine and Journal of Science Series 5, Volume 41, April 1896, pages 237-276.

The state has demonstrated a clear willingness to address global climate change (GCC) through research, adaptation[9], and GHG emission reductions. In that context, staff evaluates the GHG emissions from the Modified BSPP project, presents information on GHG emissions related to electricity generation (see **Electricity System GHG Impacts** below), and describes the applicable GHG policies and programs.

In April 2007, the U.S. Supreme Court held that GHG emissions are pollutants within the meaning of the CAA. In reaching its decision, the Court also acknowledged that climate change results, in part, from anthropogenic causes (Massachusetts et al. v. Environmental Protection Agency 549 U.S. 497, 2007). The Supreme Court's ruling paved the way for the regulation of GHG emissions by U.S. Environmental Protection Agency (U.S. EPA) under the CAA.

In response to this Supreme Court decision, on December 7, 2009 the U.S. EPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA:

- Endangerment Finding: That the current and projected concentrations of the GHGs in the atmosphere threaten the public health and welfare of current and future generations; and
- Cause or Contribute Finding: That the combined emissions of GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

As a result, regulating GHGs at the federal level is now required by U.S. EPA's Prevention of Significant Deterioration Program (PSD) for sources that exceed 100,000 tons per year of carbon dioxide-equivalent emissions and federal rules require federal reporting of GHGs. As federal rulemaking evolves, staff at this time focuses on analyzing the ability of the project to comply with existing federal- and state-level policies and programs for GHGs.

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 GHGs or global climate change[10] 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 ARB to adopt standards to reduce statewide GHG emissions to GHG emissions levels that existed in 1990, with such reductions to be achieved by 2020. To achieve this, ARB has a mandate to define

[9] While working to understand and reverse global climate change, it is prudent to also adapt to potential changes in the state's climate (for example, changing rainfall patterns).

[10] Global climate change is the result of greenhouse gases, or air emissions with global warming potentials, affecting the global energy balance and thereby the global climate of the planet. The terms greenhouse gases (GHGs) and global climate change (GCC) gases are used interchangeably.

the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions to meet this requirement. Executive Order S-3-05 signed by then-Governor Arnold Schwarzenegger in June 2005, also requires ARB to plan for further GHG emissions reductions to achieve an 80 percent reduction from 1990 GHG emissions by the year 2050.

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 significant sources of GHG via regulations, market mechanisms, and other actions. ARB adopted regulations implementing cap-and-trade regulations on December 22, 2011, and ARB staff continues to develop and implement regulations to refine key elements of the GHG reduction measures to improve their linkage with other GHG reduction programs. Federal and state mandatory reporting and state cap-and-trade requirements would most likely not apply to this project as seen in **GHG Table 3** operating emissions.

Greenhouse Gas Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
40 Code of Federal Regulations (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 measures to 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).

The California Climate Action Team produced a report to the Governor (CalEPA 2006) which included many examples of strategies that the state could pursue to reduce GHG emissions in California, in addition to several strategies that had been recommended by the Energy Commission and the California Public Utilities Commission (CPUC). Their third biennial report published in December 2010 and required by Executive Order S-3-05, is the most recent report addressing actions that California could take to reduce GHG emissions (CalEPA 2010). The scoping plan approved by ARB in December 2008 builds upon the overall climate change policies of the Climate Action Team reports and includes 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) and land use planning and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). The scoping plan includes a 33 percent RPS, aggressive energy efficiency targets, and a cap-and-trade program that includes the electricity sector (ARB 2008). Mandatory compliance period[11] with cap-and-trade requirements commenced on January 1, 2012, although enforcement was delayed until January 2013. SB 2 (Simitian, Chapter 1, Statutes of 2011-12) expresses the intent of the California Legislature to have 33 percent of California's electricity supplied by renewable sources by 2020 and the Modified BSPP project would contribute to this goal.

It is likely that GHG reductions mandated by ARB will be non-uniform or disproportional across emitting sectors, in that most reductions will be based on cost-effectiveness (i.e., the greatest GHG reduction for the least cost). For example, ARB proposes a 40 percent reduction in statewide GHG emissions from the electricity sector even though that sector currently only produces about 25 percent of the state's GHG emissions. SB 1368,[12] enacted in 2006, and regulations adopted by the Energy Commission and the CPUC, pursuant to that bill, prohibits California utilities from entering into long-term commitments with any base load facilities that exceed the Emission Performance Standard (EPS) of 0.5 metric tonnes CO_2 per megawatt-hour[13] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 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.[14] If a project, instate or out of state, plans to sell base load electricity to California utilities, those utilities will have to demonstrate that the project meets the EPS. *Base load* units are defined as units that are expected to operate at a capacity factor higher than 60 percent. Compliance with the EPS is determined by dividing the annual average carbon dioxide emissions by the annual average net electricity production in MWh. This determination is based on capacity factors, heat rates, and corresponding emissions rates that reflect the *expected* operations of the power plant and not on full load heat rates [Chapter 11, Article 1 §2903(a)]. At the January 12, 2012, Business Meeting, the Energy Commission opened an Order Instituting Rulemaking (12-OIR-1) to consider revisions to the EPS.

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[11] A compliance period is the time frame during which the compliance obligation is calculated. The years 2013 and 2014 are known as the first compliance period and the years 2015 2017 are known as the second compliance period. The third compliance period is from 2018 2020. At the end of each compliance period each facility will be required to turn in compliance instruments, including allowances and a limited number of ARB offset credits equivalent to their total GHG emissions throughout the compliance period. (http://www.arb.ca.gov/cc/capandtrade/guidance/chapter1.pdf)

[12] Public Utilities Code § 8340 et seq.

[13] The Emission Performance Standard only applies to carbon dioxide and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

[14] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

In addition to these programs, California is involved in the Western Climate Initiative (WCI), a multi-state and international effort to establish a cap-and-trade market to reduce GHG emissions in the Western United States and the Western Electricity Coordinating Council (WECC). WCI created a special entity, WCI, Inc. to assist jurisdictions that are moving ahead with cap-and-trade programs. The initial participants are California and the Canadian province of Quebec. Two other Canadian provinces may join in the near future.

Each participating entity is developing their own cap-and-trade program to reduce GHG pollution, using their own authorities, laws and regulations. These programs will be linked in a larger market if each participating organization finds that such joining of programs creates synergy and can be done without adversely impacting their own system.

WCI timelines 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 of this group. ARB continues to refine AB 32 regulations to mesh California requirements with those of the WCI to minimize leakage of GHG emissions from one geographic area to another. For example, they held a staff workshop on April 9, 2012, to discuss draft amendments to California's cap-and-trade program to better link these two efforts. None of the proposed amendments would change GHG requirements for the Modified BSPP project.

SB 1018 (Unfinished Business, Senate Budget and Fiscal Review Committee, for purposes of implementing the Budget Act of 2012) establishes new legislative oversight and controls over the ARB including: the creation of a separate expenditure fund for proceeds from the auction or sale of allowances pursuant to the market-based compliance mechanism (their cap-and-trade program); the establishment of a separate Cost of Implementation Fee account for oversight and tracking of funds; oversight of actions taken on behalf of the State of California related to market-based compliance and auctions, specific to the Western Climate Initiative and Western Climate Initiative, Incorporated; and provides for return of certain funds to ratepayers of Investor Owned Utilities from funds related to the auction or sale of allowances.

If built, the Modified BSPP project most likely would not be required to participate in California's GHG cap-and-trade program due to the operational emissions being well below the 25,000 metric tonnes (see GHG Table 3 operational emissions). This cap-and-trade program is part of a broad effort by the State of California to reduce GHG emissions as required by AB 32, which is being implemented by ARB. As currently proposed, market participants would be required to report their GHG emissions and to obtain GHG emissions allowances (and offsets) for those reported emissions by purchasing allowances from the capped market and offsets from outside the AB 32 program. As new participants enter the market and as the market cap is ratcheted down over time, GHG emission allowance and offset prices will increase encouraging innovation by market participants to reduce their GHG emissions. Thus, the Modified BSPP project, as a GHG cap-and-trade participant, would be consistent with California's landmark AB 32 Program, which is a statewide program coordinated with a region wide WCI program to reduce California's GHG emissions to 1990 levels by 2020.

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 the adequate and reliable electricity supply is complex and variable. But it operates as an integrated whole to reliably and effectively, meet demand, such that the dispatch of a new source of generation unavoidably 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 (GWh). Ancillary services[15] 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.

MODIFIED BSPP PROJECT'S GHG EMISSIONS

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 over 48 months. The GHG emissions estimate for the entire construction period, provided by the applicant for the Modified BSPP project, is presented below in **Greenhouse Gas Table 2**. Construction period GHG emissions average 13,525 MTCO2E per year (54,100 MTCO2E/48 months) X (12 months in a year).

Greenhouse Gas Table 2
Estimated Modified BSPP Potential Construction Greenhouse Gas Emissions

Construction Element	CO_2-Equivalent (MTCO2E) [1,2,3]
On-Site Construction Equipment	5,200
On-Site Motor Vehicles	700
Off-Site Motor Vehicles	48,200
Construction Total (48 months)	54,100

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 – Values shown per period for construction. Days per period: 21 days per month at 48 months = 1008 days total
Source: NEBS2013c, Table 4.1-1 and Appendix E Tables

Project Operations

The Modified BSPP project's operations GHG emissions, for all four units, are shown in **Greenhouse Gas Table 3**. Operation of the Modified BSPP project would no longer have the same level of emissions as the Approved BSPP project. This is due to

[15] See CEC 2009b, page 95.

elimination of emissions from the auxiliary boilers, HTF heaters, fire pump engines, and emergency generator engines. The Modified BSPP would only have GHG emissions from the maintenance fleet and employee trips and sulfur hexafluoride emissions from new electrical component equipment.

Greenhouse Gas Table 3
Estimated Modified BSPP Potential Operating Greenhouse Gas Emissions

	Annual CO_2-Equivalent (MTCO2E)[a]
Auxiliary Boilers [b]	--
Emergency Generators [b]	--
Fire Pumps [b]	--
Onsite equipment[16]	5.8
Maintenance Vehicles	17.1
Delivery Vehicles	9.9
Employee Vehicles	92.5
Equipment Leakage (SF_6)	24
Total Project GHG Emissions – MTCO2E [b]	**149.3**
Facility MWh per year[17]	1,052,000
Facility GHG Emission Rate (MTCO2E/MWh)	0.00014

Sources: NEBS2013c Appendix E Table 14.
[a] One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
[b] This source is no longer associated with the modified project

Greenhouse Gas Table 3 shows what the Modified BSPP 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 gasoline and diesel fuel use in the maintenance vehicles, offsite delivery vehicles, staff and employee vehicles. Another GHG emission source for this proposed project is SF_6 from electrical equipment leakage.

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*[18] **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

[16] Operations include a portable light plant generator for the modified project.

[17] Estimated using 100 percent fixed tilt energy-based efficiency (CEC staff Power Plant Efficiency Alternatives Section). A 50/50 mix (fixed tilt and tracking) would is estimated to be around 1,251,000 MWh/yr.

18 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.

transportation. However, there are additional direct transportation and indirect 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 typical energy payback time for solar power plants, such as the Modified BSPP project, to be on the order of 5 months (Greenpeace 2005, Page 9); and the project life for the Modified BSPP project is on the order of 30 years. Therefore, the proposed project's GHG emissions reduction potential from energy displacement would be substantial[19].

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 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 Modified BSPP 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

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19 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.

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.

Electricity System GHG Operational Impacts – David Vidaver

Direct/Indirect Operation Impacts and Mitigation

The Modified BSPP project would promote 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 GHG emissions. It does this is several ways:

- California's Energy Action Plan Loading Order specifies that electrical energy demand be met first by energy efficiency and demand response, followed by employing renewable energy such as would be provided by the Modified BSPP project.
- The energy produced by the Modified BSPP project would displace energy from higher GHG-emitting coal- and natural gas-fired generation resources, lowering the GHG emissions from the western United States, the relevant geographic area for the discussion of GHG emissions from electricity generation.
- The dependable capacity provided by the Modified BSPP project would facilitate the retirement/divestiture of resources that cannot meet the Emissions Performance Standard (EPS) or are adversely affected by the SWRCB's policy on once-through cooling.

CALIFORNIA'S ENERGY ACTION PLAN LOADING ORDER

In 2003, the three key energy agencies in California – the California Energy Commission, the California Power Authority (CPA), and the CPUC– came together in a spirit of unprecedented cooperation to adopt an "Energy Action Plan" (EAP) that listed joint goals for California's energy future and set forth a commitment to achieve these goals through specific actions. The EAP is a living document meant to change with time, experience, and need. In 2005 the CPUC and the Energy Commission jointly prepared an Energy Action Plan II to identify further actions necessary to meet California's future energy needs (CEC 2005).

The EAP's overarching goal is for California's energy to be adequate, affordable, technologically advanced, and environmentally-sound. Energy must be reliable – provided when and where needed and with minimal environmental risks and impacts. Energy must be affordable to households, businesses and industry, and motorists – and in particular to disadvantaged customers who rely on California government to ensure that they can afford this fundamental commodity. EAP actions must be taken with clear recognition of cost considerations and trade-offs to ensure reasonably priced energy for all Californians.

The EAP accomplishes these goals in the electricity sector by calling for a "loading order" specifying the priority order for how to balance electricity supply and demand. The loading order identifies energy efficiency and demand response as the state's preferred means of meeting growing electrical energy needs. After cost-effective efficiency and demand response, it relies on renewable sources of power and distributed generation, such as combined heat and power applications. To the extent efficiency, demand response, renewable resources, and distributed generation are unable to satisfy increasing energy and capacity needs, the loading order supports clean and efficient fossil-fired generation.

The Role of the Modified BSPP in Energy Displacement

California's renewables portfolio standard (RPS) calls for 33 percent of California's electrical energy to be provided by qualifying renewable energy facilities by the year 2020. The RPS was established by SB 1078 (Sher, Chapter 516, Statutes of 2002), effective January 1, 2003, with revisions to the law as a result of SB 1250 (Perata, Chapter 512, Statutes of 2006), SB 107 (Simitian, Chapter 464, Statutes of 2006), and SB X1 2 (Simitian, Chapter 1, Statutes of 2011, First Extraordinary Session). The RPS originally required California's electric utilities to obtain at least 20 percent of its power supplies from renewable sources by 2010. It now has been expanded to require retail sellers of electricity and local publicly owned electric utilities (POUs) to increase the amount of renewable energy they procure until 33 percent of their retail sales are served with renewable energy by December 31, 2020. Under the law, the Energy Commission is required to certify eligible renewable energy resources that may be used by retail sellers of electricity and POUs to satisfy their RPS procurement requirements, develop an accounting system to verify retail sellers' and POUs' compliance with the RPS, and adopt regulations specifying procedures for enforcement of the RPS for the POUs.

As California moves towards an increased reliance on renewable electrical energy by implementing the RPS, non-renewable electric energy resources will be displaced. A 33 percent RPS is forecasted to require California load-serving entities to procure more than 82,800 GWh of renewable electrical energy in 2024, an increase of roughly 28,300 GWh over current levels.[20]

Given an RPS, renewable electrical energy displaces electricity that would otherwise be produced from coal- and natural gas-fired generation. The construction and operation of the BSPP would not displace other renewable resources as load-serving entities must meet the renewable energy purchase requirements embodied in the RPS. Even in the absence of an RPS, the Modified BSPP project would not replace other renewables. The fuel and other variable costs associated with most forms of renewable generation are much lower than for other resources and even where this may not be the case (e.g., selected biofuels) the renewable resource will frequently have a "must-take" contract with a load-serving entity requiring that all of electrical energy produced by the project be purchased by the buyer. Hydroelectric generation is not displaced as it has very low

[20] Retail sales requiring renewable procurement are forecasted to be almost 283,300 GWh in 2024 (CEC 2013a); as of January 2013 California is estimated to have procured 54,400 GWh (CEC 2013a)

variable costs of production; the variable cost of nuclear generation is much lower than for fossil resources as well.

The Modified BSPP project would produce far less GHG emissions (emitting approximately 0.308[21] lbs CO2/MWh) than the coal- and natural gas-fired resources it would displace. Coal-fired generation requires the combustion of 9,000 – 10,000 Btu/MWh, resulting in more than 1,800 lbs CO2/MWh. Natural gas-fired generation in California requires an average of 8,566 Btu/MWh, yielding approximately 1,000 lbs CO2/MWh (CEC 2011b).[22]

The Role of the Modified BSPP in Capacity Displacement

The Modified BSPP would provide up to 485 MW of electrical capacity and associated electrical energy to the grid during early afternoon hours in the summer. Electricity demand in California reaches its peak during mid- to late-afternoon on the hottest weekdays of the summer. Dependable capacity – the amount of capacity that can be counted upon to be available during the peak - is needed to reliably serve loads; the generation fleet, in conjunction with demand response programs, must provide a sufficient amount of dependable capacity to meet demand on the highest load day of the year.[23] Load-serving entities in the California Independent System Operator (Cal ISO) control area, for example, are required by the Cal ISO to procure dependable capacity in amounts determined by their peak load forecast.

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, 1,549 MW of coal-fired generation capacity under contract will have to reduce GHG emissions or be replaced; these contracts are presented in **Greenhouse Gas Table 4**.

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[21] Derived from **Greenhouse Gas Table 3** Estimated BSPP Operating Period Greenhouse Gas Emissions

[22] The BSPP would displace resources with a higher than average heat rate during most hours, as the most expensive (least efficient) resources would be displaced.

[23] This is usually the hottest weekday in the summer, when residential and commercial cooling loads are at their highest.

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

Utility	Facility	Contract Expiration	MW
Department of Water Resources	Reid Gardner	2013 [1]	213
SDG&E	Boardman	2013	84
SCE [2]	Four Corners	2016	720
Turlock Irrigation District	Boardman	2018	55
LADWP	Navajo	2019	477
		TOTAL	**1,549**

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
Notes:
1. Contract not subject to Emission Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.
2. The sale of SCE's share of Four Corners to Arizona Public Service has been approved by the CPUC and is awaiting FERC approval.

Retirement of Generation Using Once-Through Cooling

The State Water Resource Control Board's (SWRCB) policy on cooling water intake at coastal power plants has led to the retirement and replacement of several plants that used OTC. Numerous others are likely to retire on or prior to assigned compliance dates,[24] some of which will require replacement.[25] The units with compliance dates on or before the end of 2020 are presented in **Greenhouse Gas Table 5**.

[24] Most of the OTC units are aging facilities, for which extensive retrofits will be uneconomical. While compliance using operational and structural controls is allowed, the ability of units to comply in this manner and still operate in a fashion that yields a sufficient revenue stream is questionable.

[25] The California ISO, CPUC and the Energy Commission are studying amount of OTC capacity that will require replacement.

Greenhouse Gas Table 5
OTC Units with SWRCB Compliance Dates on or before December 31, 2020[26]

Plant Name & Unit	Local Reliability Area	Capacity (MW)
Alamitos 1 – 6	LA Basin	2,010
El Segundo 3 & 4	LA Basin	670
Encina 1 – 5	San Diego	950
Huntington Beach 1 & 2	LA Basin	430
Mandalay 1 & 2	Ventura	436
Morro Bay 3 & 4	None	650
Moss Landing 6 & 7	None	1,510
Moss Landing 1 & 2	None	1,020
Ormond Beach 1 & 2	Ventura	1,516
Pittsburg 5 & 7 [2]	SF Bay	1,311
Redondo Beach 5 – 8	LA Basin	1,356
Total		**11,859**

Notes:
Pittsburg Unit 7 (682 MW) does not use once-through cooling but would be required to shut down if Units 5 and 6 retire.

CLOSURE AND DECOMMISSIONING

Eventually the Modified BSPP project 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 over time, 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.

[26] Greenhouse Gas Table 5 does not include OTC units that retired prior to January 1, 2012, resources with compliance dates through 2020 that have already been slated for replacement (e.g., LADWP units at Haynes and Scattergood), or units with post-2020 compliance dates (the remaining units at Haynes and Scattergood, LADWP's Harbor combined cycle, and the nuclear facilities at San Onofre [which Southern California Edison announced on June 7, 2013 that they would close it rather than repair it] and Diablo Canyon).

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.

Cumulative effects are defined by NEPA regulations as “…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions” (40 CFR 1508.7).

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 Modified BSPP project, as a solar energy generation facility, would be 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 Modified BSPP 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]).

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 Western Electricity Coordinating Council (WECC) electricity systems. Additionally, the Modified BSPP project would contribute to meeting the state’s AB 32 goals.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

There have been no agency or public comments received on staff’s greenhouse gas section.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification related to greenhouse gas emissions are proposed. The project owner is expected to be exempt from ARB GHG emissions reporting regulations (California Code of Regulations, tit. 17, Subchapter 10, Article 2, Sections 95100 et. seq.) and/or future GHG regulations formulated by the U. S. EPA or the ARB, such as GHG emissions cap-and-trade requirements.

CONCLUSIONS

The Modified BSPP project 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 CEQA and NEPA, would not worsen current conditions, and would thus not result in CEQA impacts that are cumulatively significant or result in adverse NEPA impacts.

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 may be part of the ARB regulations to reduce GHG from construction vehicles and equipment. Finally, the construction, operation 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 Modified BSPP project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Title 20, Greenhouse Gases Emission Performance Standard, Section 2900 et. seq.). The project is not subject to the requirements of SB 1368 (Greenhouse Gasses Emission Performance Standard; Cal. Code Reg., tit. 20, § 2900 et. Seq.) and the Emission Performance Standard; however, it would nevertheless meet the Emission Performance Standard.

MITIGATION MEASURES/PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to project greenhouse gas emissions are proposed.

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ACRONYMS

ARB	California Air Resources Board
BSPP	Blythe Solar Power Project
CalEPA	California Environmental Protection Agency
CEE	California Energy Commissions
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	Megawatt
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
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

BIOLOGICAL RESOURCES

Andrea Martine and Carol Watson

THIS SECTION WILL BE PROVIDED IN THE

STAFF ASSESSMENT – Part B

CULTURAL RESOURCES

Melissa Mourkas, Thomas Gates and Michael McGuirt

THIS SECTION WILL BE PROVIDED IN THE

STAFF ASSESSMENT – Part B

HAZARDOUS MATERIALS MANAGEMENT

Testimony of Alvin Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Energy Commission staff (staff) evaluated the Revised Petition to Amend filed April 12, 2013 (NEBSEC2013a) to modify the Blythe Solar Power Project (BSPP) that was approved by the Commission in 2010 (CEC 2010d) in terms of hazardous materials use. Staff's analysis indicates that with implementation of staff's proposed mitigation measures, hazardous materials use at the site would not present a significant impact to the public. With adoption of the proposed conditions of certification, the proposed project would comply with all applicable laws, ordinances, regulations, and standards (LORS). Energy Commission staff proposes conditions of certification to address safe handling of hazardous materials, transportation of hazardous materials, and site security.

The proposed Hazardous Materials Management Conditions of Certification are slightly modified from the existing conditions of certification to account for the discontinuation of the project's use of heat transfer fluid (HTF) and removal of the natural gas pipeline.

INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed modified BSPP has the potential to cause significant impacts on the public as a result of the use, handling, storage, or transportation of hazardous materials at the proposed site. If significant adverse impacts to the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce those impacts to the extent feasible.

This analysis does not address the potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide them with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. The **Worker Safety and Fire Protection** section of this document describes applicable requirements for the protection of workers from these risks.

For this analysis, staff examines plausible potential loss of containment incidents (spills) for the hazardous materials to be used at the proposed facility. The worst case plausible event, regardless of cause, is considered and analyzed to see whether the risk to local populations is significant. Hazardous material handling and usage procedures are designed to reduce the likelihood of a spill, to reduce its potential size, and to prevent or reduce the potential migration of a spill off-site to the extent that there won't be significant off-site impacts. These measures look at potential direct contact from runoff of spills, air-borne plume concentrations, and the potential for spills to mix with runoff water and be carried off-site. Generally, staff seeks to confirm that the applicant has proposed secondary containment basins for containing liquids, and that volatile chemicals would have a restricted exposure to the atmosphere after capture.

Various hazardous materials including mineral and lubricating oils, cleaning detergents, water treatment chemicals, and welding gasses would be present at the proposed BSPP project. The major modification to the project is replacing parabolic trough solar technology that uses millions of gallons of HTF with solar photovoltaic (PV) technology. The modified BSPP project would also not use natural gas for HTF heaters and therefore no natural gas pipeline to the site is needed. The BSPP project would require the transportation of much smaller quantities of hazardous materials to the facility. This document addresses all potential impacts associated with the use and handling of hazardous materials.

METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Staff reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals were evaluated. Staff's analysis addresses the potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of hazardous materials. In order to accomplish this goal, staff utilized the most current public health exposure levels (both acute and chronic) that are established to protect the public from the effects of an accidental chemical release.

In order to assess the potential for released hazardous materials to travel off site and affect the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some hazardous materials must be used at power plants. Therefore, staff conducted its analysis by examining the choice and amount of chemicals to be used, the manner in which the applicant will use the chemicals, the manner by which they will be transported to the facility and transferred to facility storage tanks, and the way the applicant plans to store the materials on site.

Staff reviewed the applicant's proposed engineering and administrative controls concerning hazardous materials usage. Engineering controls are the physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can prevent the spill of hazardous material from occurring, or which can either limit the spill to a small amount or confine it to a small area. Administrative controls are the rules and procedures that workers at the facility must follow that will help to prevent accidents or to keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off site and causing harm to the public.

Staff reviewed and evaluated the applicant's proposed use of hazardous materials as described by the applicant (Solar Millennium 2009a, Section 5.6) for the approved project and in the Revised Petition to Amend (NEBSEC2013a) for the modified project. Staff's assessment followed the five steps listed below.

- **Step 1**: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in Table 5.6-3 of the AFC (Solar Millennium 2009a) and Table 2-7 of the Revised Petition to Amend (NEBSEC2013a) and Table 4 of the Response to

Data Requests (NEBSEC2013e) and determined the need and appropriateness of their use.

- **Step 2**: Those chemicals proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off site and impact the public were removed from further assessment.
- **Step 3**: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different-sized transfer-hose couplings and administrative controls such as worker training and safety management programs.
- **Step 4**: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
- **Step 5**: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials, as reduced by the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to an insignificant level, staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management. Staff's analysis examines the project's compliance with these requirements.

Hazardous Materials Management Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on risk management plans (42 USC §112(r)	Requires states to implement a comprehensive system informing local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.802	The U.S. Department of Transportation (DOT) requirement that suppliers of hazardous materials prepare and implement security plans.
49 CFR Part 1572, Subparts A and B	Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks.

Applicable Law	Description
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.
State	
California Health and Safety Code, section 41700	Requires that “No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
Hazardous Material Business Plan, Cal HSC Sections 25500 to 25541; 19 CCR Sections 2720 to 2734	Requires the submittal of a chemical inventory and planning and reporting for management of hazardous materials.
Hazardous Substance Information and Training Act, 8 CCR Section 339; Section 3200 et seq., 5139 et seq., and 5160 et seq.	Requires listing and implementation of specified control measures for management of hazardous substances.
California HSC Sections 25270 through 25270.13	Requires the preparation of a Spill Prevention, Control, and Countermeasures (SPCC) Plan if 10,000 gallons or more of petroleum is stored on-site. The above regulations would also require the immediate reporting of a spill or release of 42 gallons or more to the California Office of Emergency Services and the Certified Unified Program Authority (CUPA).
Local	
Riverside County Fire Code, Riverside County Code Chapter 8.32: Ordinance No. 787	Adopts the California Fire Code, 2013 Edition, with some of its appendices, into Riverside County regulations.
Disclosure of Hazardous Materials and the Formulation of Business Emergency Plans: Riverside County Ordinance 651	Requires disclosure where businesses handle hazardous materials and requires the development of response plans; designates Riverside County Department of Environmental Health as responsible for administration and enforcement of local codes.

The Certified Unified Program Agency (CUPA) with the responsibility to review the Hazardous Materials Business Plan (HMBP) is the Riverside County Environmental Health Department (RCEHD). With regard to seismic safety issues, the site is located in a Seismic Zone 4. Construction and design of buildings and vessels storing hazardous materials would meet the appropriate seismic requirements of the 2013 California Building Code.

PROPOSED MODIFIED PROJECT

The modifications proposed in the April 2013 revised petition to amend would replace the solar thermal technology entirely with PV generating technology, eliminate the need for HTF, reduce the physical size of the BSPP, and reduce the amount of generated electricity. The modified project would be located entirely on publicly owned land managed by the Bureau of Land Management (BLM), a total of 4,070 acres, excluding off-site linear facilities, which is approximately 3,000 acres less than the original approved 7,043 acres (**Project Description Figure 1**). Linear access to the site would be the same as for the original approved project, and BSPP would continue to interconnect to the regional transmission grid via the same gen-tie line to Southern California Edison's Colorado River Substation, which is currently under construction.

NextEra Blythe Solar proposes to develop the BSPP in four phases designed to generate a total of approximately 485 MW (nominal) of electricity when completed (**Project Description Figure 2**). NextEra Blythe Solar has not selected the specific PV modules nor has it decided on whether a tracker system, fixed tilt system, or combination of the two systems would be installed. NextEra Blythe Solar is requesting the Decision be amended to allow the specific combination of PV technologies to be selected prior to construction without the need for filing another amendment. All four units would share an operations and maintenance facility, one on-site switchyard, access and maintenance roads, perimeter fencing and other ancillary security facilities, and a 230-kV gen-tie line.

SETTING AND EXISTING CONDITIONS

Several factors associated with the area in which a project is to be located affect the potential for an accidental release of a hazardous material that could cause public health impacts. These include:

- local meteorology;
- terrain characteristics; and,
- location of population centers and sensitive receptors relative to the project.

Meteorological Conditions

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

Recorded wind speeds and ambient air temperatures are described in the **Air Quality** section (5.2.2.2) and Appendix E.1 of the Application for Certification (Solar Millennium 2009a).

Terrain Characteristics

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The topography of the site is mostly flat (ranges between 420 and 670 feet above sea level), with elevated terrain existing to the west and southwest within 1-2 miles of the site (Solar Millennium 2009a, Section 2.4.1 and Figure 1-2).

Location of Exposed Populations and 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 major bearing on health risk. There are no sensitive receptors within a 3-mile radius of the project site. The nearest sensitive receptor is the Palo Verde Valley High School located about 7 miles east of the project site and the nearest residence is located adjacent to the project boundary on a private parcel that is surrounded from all sides by the project footprint (Solar Millennium 2009a, Section 5.10.2 and Figure 5.10-2).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps 1 and 2 that some hazardous materials, although present at the proposed facility, pose a minimal potential for off-site impacts since they would be stored in a solid form or in smaller quantities, have low mobility, or have low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are briefly discussed below.

During the construction phase of the project, hazardous materials proposed for use include paint, solvents, gasoline, diesel fuel, motor oil, lubricants, and welding gases (NEBSEC2013a), Table 2-7). No acutely toxic hazardous materials would be used on site during construction, and none of these materials pose significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility. Any impact of spills or other releases of these materials would be limited to the site because of the small quantities involved, their infrequent use (and therefore reduced chances of release), and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel are all very low volatility and represent limited off-site hazards even in larger quantities.

During operations, hazardous chemicals such as cleaning agents, water treatment chemicals, welding gasses, oils, activated carbon, and other various chemicals (see **Hazardous Materials Appendix A** for a list of chemicals proposed to be used and stored at the modified BSPP during operations) would be used and stored in relatively small amounts and represent limited off-site hazards because of their small quantities, low volatility, and/or low toxicity. The project would be limited to using, storing, and transporting only those hazardous materials listed in **Appendix A** of this section as per staff's proposed revised Condition of Certification **HAZ-1**.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 and determined that only sulfuric acid and sodium hydroxide required further evaluation.

Large Quantity Hazardous Materials

Sulfuric Acid (93%) and Sodium Hydroxide (50%)

Up to 1000 gallons of each would be stored on-site for water treatment (NEBSEC2013e). However, because of their very low vapor pressures, these hazardous materials can pose a risk to the off-site public and on-site workers only through direct contact. Because they would be delivered in self-contained "totes" (see discussion below regarding totes) and would not be stored at any one location in a quantity greater than 400 gallons, staff concludes that the risk of impact to the off-site public is less than significant.

At this site, several factors influenced staff's conclusion that the risk of off-site impacts of a release of sulfuric acid or sodium hydroxide would be extremely low and thus air dispersion modeling would not be required:

1. The maximum of each tote is 400 gallons and totes are self-contained units that do not involve the transfer of the material from a tanker truck to a large storage tank. They are delivered already containing the hazardous material.

2. Each tote would have secondary spill containment to limit the spread of any spilled aqueous ammonia, thus limiting the size of the pool of material available for evaporation and dispersion.

3. Previous modeling at other power plants by staff of far greater amounts of sulfuric acid spilling onto a road show very limited dispersion and the distance to a level of less than a significant airborne concentration is usually only a short distance (not more than 50 feet) from the spill. A spill into a containment area would have even a lesser dispersion distance.

4. Totes have an excellent safety record of structural integrity and minimal spills and the chance that more than one would fail at the same time is extremely remote.

5. The nearest off-site public receptors are seven miles from the project fence line.

Therefore, staff concludes that any spill of any hazardous material from any one of the totes on the site would not result in an airborne concentration at any off-site location and thus would pose a less than significant risk to the public.

Mitigation

Staff believes that this project's use of hazardous materials poses no significant risk but only if mitigation measures are implemented. These mitigation measures are discussed in this section. The potential for accidents resulting in the release of hazardous materials is greatly reduced by the implementation of a Safety Management Program, which includes both engineering and administrative controls. Elements of facility controls and the safety management plan are summarized below.

Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off site and affecting communities by incorporating engineering safety design criteria in the design of the project. The engineered safety features proposed by the applicant for use at the BSPP project include:

- Storage of small quantity hazardous materials in original, properly labeled containers;
- construction of secondary containment areas surrounding each of the bulk fuel storage areas designed to contain accidental releases that might happen during storage or delivery;
- physical separation of stored chemicals in isolated containment areas in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes; and,
- installation of a fire protection system for hazardous materials storage areas.

Administrative Controls

Administrative controls also help prevent accidents and releases (spills) from moving off site and affecting neighboring communities by establishing worker training programs, process safety management programs, and complying with all applicable health and safety laws, ordinances, and standards.

A worker health and safety program will be prepared by the applicant and include (but not be limited to) the following elements (see the **Worker Safety and Fire Protection** section for specific regulatory requirements):

- worker training regarding chemical hazards, health and safety issues, and hazard communication;
- procedures to ensure the proper use of personal protective equipment;
- safety operating procedures for the operation and maintenance of systems utilizing hazardous materials;
- fire safety and prevention; and,
- emergency response actions including facility evacuation, hazardous material spill clean-up, and fire prevention.

At the facility, the project owner will be required to designate an individual with the responsibility and authority to ensure a safe and healthful work place. The project health and safety official will oversee the health and safety program and have the authority to halt any action or modify any work practice to protect the workers, facility, and the surrounding community in the event of a violation of the health and safety program.

Staff’s proposed Condition of Certification **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in Table 2-7 of the Revised Petition to Amend (NEBSEC2013a) and Table 4 of the Response to Data Requests (NEBSEC2013e) which have been reviewed by staff to determine the need and appropriateness of their use. **HAZ-1** also requires changes to the allowed list of hazardous materials and their maximum amounts to be approved by the Compliance Project Manager. Only those that are needed and appropriate would be allowed to be used. If staff feels that a safer alternative chemical can be used, staff would recommend or require its use, depending upon the impacts posed.

Additional administrative controls are required by existing Conditions of Certification **HAZ-2**: preparation of a Hazardous Materials Business Plan (HMBP) and a Spill Prevention, Control, and Countermeasure Plan (SPCC Plan) and **HAZ-3** (development of a Safety Management Plan).

On-Site Spill Response

In order to address the issue of spill response, the facility will prepare and implement an emergency response plan that includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, and prevention equipment and capabilities, as well as other elements. Emergency procedures will be established which include evacuation, spill cleanup, hazard prevention, and emergency response.

The presence of oil in a quantity greater than 1,320 gallons might invoke a requirement to prepare a Spill Prevention Control and Countermeasures (SPCC) Plan. The quantity of oil contained in any one of the planned 230/500 kV transformers would be in excess of the minimum quantity that requires such a plan. However, there are no known waters of the United States but there are known Waters of the State and thus staff's position is that an SPCC Plan is required by 40 CFR 112. However, even if this was not true, pursuant to California Health and Safety Code (HSC) Sections 25270 through 25270.13, the BSPP will be required to prepare a SPCC because it will store 10,000 gallons or more of petroleum on-site. The above regulations would also require the immediate reporting of a spill or release of 42 gallons or more to the California Office of Emergency Services and the Certified Unified Program Authority (CUPA).

Plant personnel would be trained as a hazardous materials response team which would be the first responder to hazardous materials incidents. In the event of a large incident involving hazardous materials, backup support would be provided by the Riverside County Fire Department (RCFD) which has a hazmat response unit capable of handling any incident at the proposed BSPP and would respond in about 1.5-2 hours (Solar Millennium 2009a, Section 5.6.4.2 and RCFD 2010).

Transportation of Hazardous Materials

Various containerized and bulk hazardous materials would be transported to the facility via truck. While many types of hazardous materials will be transported to the site, staff believes that transport poses little risk due to the small quantities involved and the use of totes (see discussion on totes above).

Staff reviewed the applicant's proposed transportation routes for hazardous materials delivery. Trucks would travel on I-10 to the project site via a new access road (Solar Millennium 2009a, Section 5.6.3.3). Staff believes it is appropriate to rely upon the extensive regulatory program that applies to the shipment of hazardous materials on Interstate highways in California to ensure safe handling in general transportation (see

Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, DOT regulations 49 CFR subpart H, §172–700, and California Department of Motor Vehicles (DMV) regulations on hazardous cargo). These regulations also address the issue of driver competence.

Staff therefore believes that the risk of exposure to significant concentrations of hazardous materials during transportation to the facility is insignificant because of the remote possibility that an accidental release of a sufficient quantity could be dangerous to the public. The transportation of similar volumes of hazardous materials on the nation’s highways is neither unique nor infrequent. Staff has also determined that the hazardous materials transportation associated with this project would not significantly increase the cumulative risks associated with regional hazardous materials transportation.

Seismic Issues

It is possible that an earthquake could cause the failure of hazardous materials storage tanks. An earthquake could also cause failure of the secondary containment system (berms and dikes), pipes and valves in the water treatment unit, and the failure of electrically controlled command and control systems. The failure of all of these preventive control measures might then result in leaks of chemicals that may cause fires or impact the environment.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused both to several large storage tanks and to smaller tanks associated with the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while the newer tanks sustained displacements and failures of attached lines. Staff reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks failed as a result of that earthquake. Staff also conducted an analysis of the codes and standards which should be followed when designing and building storage tanks and containment areas to withstand a large earthquake. Staff notes that the proposed facility will be designed and constructed to the standards of the 2013 California Building Code for Seismic Risk Zone 4 (Solar Millennium 2009a, Section 5.6.3.3).

Staff has also begun a review of the impacts of the recent earthquakes in Haiti (January 12, 2010; magnitude 7.0) and Chile (February 27, 2010; magnitude 8.8). The building standards in Haiti are extremely lax while those in Chile are as stringent and modern as California seismic building codes. Yet, the preliminary reports show a lack of impact on hazardous materials storage and pipelines infrastructure in both countries. For Haiti, this most likely reflects a lack of industrial storage tanks and gas pipelines; for Chile, this most likely reflects the use of strong safety codes.

Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake (with newer tanks) and in the 2010 Chilean earthquake, staff determined that tank failures during seismic events are not probable and do not represent a significant risk to the public.

Site Security

The modified BSPP will not use hazardous materials in sufficient quantities to place this project under the jurisdiction of the U.S. Department of Homeland Security Chemical Facility Antiterrorism Standard (CFATS) regulation (6CFR Part 27). However, staff believes that site security measures should be developed and implemented to prevent unauthorized access as well as to follow general security measures because the energy generation sector is one of 14 areas of critical Infrastructure listed by the U.S. Department of Homeland Security. Guidelines published by the North American Electric Reliability Corporation (NERC) entitled *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002) should be implemented at a minimum.

In order to ensure that this facility (or a shipment of hazardous material) is not the target of unauthorized access, staff's proposed conditions of certification **HAZ-5** and **HAZ-6** address both construction security and operations security plans. These plans would require the implementation of site security measures that are consistent with both the above-referenced documents and Energy Commission guidelines.

The goal of these conditions of certification is to provide the minimum level of security for power plants needed to protect California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for this power plant is dependent upon the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event.

In order to determine the level of security, the Energy Commission staff used an internal vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the NERC 2002 guidelines, the U.S. Department of Energy Vulnerability Assessment Methodology for Chemical Facilities (VAM-CF) model, and U.S. Department of Homeland Security regulations published in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that the BSPP would fall into the "very low vulnerability" category, so staff proposes that certain security measures be implemented, but does not propose that the project owner conduct its own vulnerability assessment.

These security measures include perimeter fencing, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of a security breach. Site access for vendors would be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors would have to maintain their transport vehicle fleets and employ only drivers who are properly licensed and trained. The project owner would be required, through its contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements that hazardous materials vendors prepare and implement security plans if those shipments fall under the requirements of 49 CFR 172.802 and ensure that all hazardous materials drivers are in compliance with personnel background security checks per 49 CFR Part 1572, Subparts A and B, if appropriate. The compliance project manager (CPM) may authorize modifications to these measures, or may require additional measures in response to additional guidance provided by the U.S.

Department of Homeland Security, the U.S. Department of Energy, or NERC, after consultation with appropriate law enforcement agencies and the applicant.

For public safety and site security, the BSPP would have fencing around the site and access would be controlled via gates located at the entrances to the facility (at Units 1 and 4) consistent with the approved project. There would be a guard shack at the main facility gate during construction. A secondary access gate, similar in construction to the main gate, would be used for emergency purposes only. A fire department Knox Box[1] or other access device and emergency contact placard would be provided at the main gate and secondary access gate to provide emergency access.

Fencing would be installed around the solar plant site perimeter, substations, and around the evaporation pond described in accordance with the existing Conditions of Certification.

Project Closure and Decommissioning

Closure of the proposed modified BSPP (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 and would include monitoring of hazardous materials storage vessels, safe cessation of processes which use hazardous materials, disposal of hazardous materials and hazardous wastes, and documentation of practices and inventory (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 BSPP.

Therefore, based on staff's analysis for the construction and operation phases of this project, staff concludes that hazardous materials-related impacts from closure and decommissioning of the BSPP would be insignificant.

CUMULATIVE IMPACTS

The **Executive Summary** provides detailed information on the potential cumulative solar and other development projects in the project area (see also Figure 1 in the ES). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed modified project. In summary, these projects are placed into three categories:

- Past and present "existing" projects on BLM, State, and private lands: Nine "existing" projects are identified in the **Executive Summary**.
- "Pending" energy projects in the immediate area and in the desert region: Eleven "pending" projects are identified in the **Executive Summary**.
- "Foreseeable" projects on BLM, State, and private lands: Thirty-four "foreseeable" projects are identified in the **Executive Summary**.

[1] The **KNOX-BOX**® Rapid Entry System provides non-destructive emergency access to commercial and residential property.

All of the above projects are defined within a geographic area that has been identified by the Energy Commission 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 the California Environmental Quality Act (CEQA). Even if the cumulative projects described in the **Executive Summary** have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this section.

Effects of Past and Present Projects

For this analysis, staff notes that many – if not all - of these projects or developments in the area or region have or will use, store, and/or transport small quantities of hazardous materials. However, for the reasons stated below, staff has found that when combined with the proposed modified BSPP, none would have a cumulative impact on the region. The use of hazardous materials in large quantities is neither frequent nor concentrated in this area and the distances between the projects are very great. Operating, under construction, or proposed power plants in the region that store, use, and/or transport hazardous materials in the area have had any direct hazardous materials management impacts mitigated to a level of less than significance.

Staff has analyzed the potential for hazardous materials cumulative impacts at many other power plant projects located in California and in the region of the proposed modified BSPP. A significant cumulative hazardous materials impact is defined as the simultaneous uncontrolled release of hazardous materials from multiple locations in a form (gas or liquid) that could cause a significant impact where the release of one hazardous material alone would not cause a significant impact. Existing locations that use or store gaseous or liquid hazardous materials, or locations where such facilities might likely be built, were both 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 an uncontrolled release. The chances of one uncontrolled release occurring are remote. The chance of two or more occurring simultaneously, with resulting airborne plumes mingling to create a significant impact, are even more remote. Staff believes the risk to the public is insignificant.

The project owner will develop and implement a hazardous materials handling program for the modified BSPP independent of any other projects considered for potential cumulative impacts. Staff believes that the facility, as proposed by the project owner and with the additional mitigation measures proposed by staff, poses a minimal risk of accidental release that could result in off-site impacts. It is unlikely that an accidental release that has very low probability of occurrence (about one in one million per year) would independently occur at this site and another facility at the same time. Therefore, staff concludes that the facility would not contribute to a significant hazardous materials-related cumulative impact.

Contribution of the Modified BSPP to Cumulative Impacts

Construction. The construction of the modified BSPP is not expected to result in short term adverse impacts related to hazardous materials use during construction activities. It is expected that some of the cumulative projects described above which are not yet built may be under construction at the same time as the modified BSPP, however, short term impacts related to Hazardous Materials Management during construction of those cumulative projects are not expected to occur.

Operation. The operation of the modified BSPP is not expected to result in long term adverse impacts during operation of the project related to Hazardous Materials Management even though it is expected that some of the cumulative projects described above may be operational at the same time as the modified BSPP.

Decommissioning. The decommissioning of the modified BSPP is not expected to result in adverse impacts related to Hazardous Materials Management 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, it is not expected that significant impacts related to Hazardous Materials Management during decommissioning of the modified BSPP generated by the cumulative projects will occur.

Cumulative Conclusions

The potential for off-site impacts resulting from hazardous materials use at the modified BSPP is less than significant due to the nature of the materials used and the engineering and administrative controls that would be implemented to prevent and control accidental releases of hazardous materials. Because of this determination, and the additional fact that there are no existing or future foreseeable facilities in the immediate proximity (less than 1 mile) using large amounts of hazardous chemicals, there is little (if any) possibility that vapor plumes would mingle (combine) to produce an airborne concentration that would present a significant risk should an accidental release occur.

NOTEWORTHY PUBLIC BENEFITS

The construction and operation of a solar power plant such as the proposed modified BSPP requires smaller quantities of hazardous materials and materials that are less dangerous to the public than a natural-gas fired power plant or a solar thermal plant using heat transfer fluid. Building solar power plants to supply the required energy in California therefore benefits the public by reducing the risks otherwise associated with the use and transport of large quantities of more hazardous materials such as aqueous or anhydrous ammonia.

RESPONSE TO COMMENTS

Comment: The Riverside County Department of Environmental Health (RCDEH) commented that the facility may require a business emergency plan for the storage of hazardous materials greater than 55 gallons, 200 cubic feet or 500 pounds, or any acutely hazardous materials or extremely hazardous substances. If further review of the site indicates additional environmental health issues, the Hazardous Materials Management Division reserves the right to regulate the business in accordance with applicable County Ordinances.

*Response: The information provided by the applicant in the AFC indicates that the project intends to comply with all the requirements of the RCDEH. Staff's proposed condition **HAZ-2** would require the production of a hazardous materials business plan and other emergency response plans which will be required to be submitted to the RCDEH and the RCFD for review and comment, and to the Energy Commission Compliance Project Manager for review and approval.*

CONCLUSIONS

Staff's evaluation of the proposed modified project (with proposed mitigation measures) indicates that, due to the nature of the materials used and the engineering and administrative controls that would be implemented to prevent and control accidental releases of hazardous materials, hazardous material use, storage, and transportation would not pose a significant impact on the public. Because of this determination, and the additional fact that there are no existing or future foreseeable facilities in the immediate proximity (less than 1 mile) using large amounts of hazardous chemicals, there is little (if any) possibility that vapor plumes would mingle (combine) to produce an airborne concentration that would present a significant cumulative risk should an accidental release occur. With adoption of the proposed conditions of certification, the proposed project would comply with all applicable LORS. Other proposed conditions of certification address the issues of site security matters.

Staff recommends that the Energy Commission impose the proposed conditions of certification to ensure that the modified project is designed, constructed, and operated in compliance with applicable LORS, and would protect the public from significant risk of exposure to an accidental release of hazardous materials. If all mitigation proposed by the applicant and by staff are implemented, the use, storage, and transportation of hazardous materials would not present a significant risk to the public.

Staff proposes five conditions of certification which are mentioned in the text above. Revised **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in revised **Appendix A** of this section, unless there is prior approval by the Energy Commission Compliance Project Manager. Revised **HAZ-2** ensures that local emergency response services are notified of the amounts and locations of hazardous materials at the facility, and because HTF would no longer be used on the site, staff recommends that **HAZ-2** be revised to remove the requirement for a Process Safety Management Plan. Existing **HAZ-3** requires the development of a Safety Management Plan that addresses the delivery of all liquid hazardous materials during the construction, commissioning, and operation of the project would further reduce the risk of any accidental release not specifically addressed by the proposed spill prevention mitigation measures, and further prevent the mixing of incompatible materials that could result in the generation of toxic vapors. Existing **HAZ-4** is not necessary due to the project no longer using HTF and thus staff recommends its deletion. Site security during both the construction and operation phases is addressed in **HAZ-5** and **HAZ-6.**

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in Appendix A, below, or in greater quantities or strengths than those identified by chemical name in Appendix A, below, unless approved in advance by the Compliance Project Manager (CPM).

Verification: The project owner shall provide to the CPM, in the Annual Compliance Report, a list of hazardous materials contained at the facility.

HAZ-2 The project owner shall concurrently provide a Hazardous Materials Business Plan (HMBP)~~,~~ **and** a Spill Prevention, Control, and Countermeasure Plan (SPCC) ~~and a Process Safety Management Plan (PSMP)~~ to the Riverside County Environmental Health Department (RCEHD), the Riverside County Fire Department (RCFD), and the CPM for review. After receiving comments from the RCEHD, the RCFD, and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final HMBP shall then be provided to the RCEHD for information and to the CPM for approval.

Verification: At least 60 days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Hazardous Materials Business Plan, a Spill Prevention, Control, and Countermeasure Plan, and a Process Safety Management Plan to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for the delivery and handling of liquid hazardous materials. The plan shall include procedures, protective equipment requirements, training and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least 60 days prior to the delivery of any liquid hazardous material to the facility, the project owner shall provide a Safety Management Plan as described above to the CPM for review and approval.

~~**HAZ-4** The project owner shall place an adequate number of isolation valves in the Heat Transfer Fluid (HTF) pipe system for section and loop isolation in the event of a fluid leak such that the volume of a total loss of HTF from that isolated pipe system or loop will not exceed 1,250 gallons. These valves shall be actuated manually, remotely, or automatically. The engineering design drawings showing the number, location, and type of isolation valves shall be provided to the CPM for review and approval prior to the commencement of the solar array piping construction.~~

~~**Verification:** At least 30 days prior to the commencement of solar array piping construction, the project owner shall provide the design drawings as described above to the CPM for review and approval.~~

HAZ-5 Prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the

CPM for review and approval. The Construction Security Plan shall include the following:

1. perimeter security consisting of fencing enclosing the construction area;
2. security guards;
3. site access control consisting of a check-in procedure or tag system for construction personnel and visitors;
4. written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on site or off site;
5. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
6. evacuation procedures.

Verification: At least 30 days prior to commencing construction, the project owner shall notify the CPM that a site-specific Construction Security Plan is available for review and approval.

HAZ-6 The project owner shall also prepare a site-specific security plan for the commissioning and operational phases that will be available to the CPM for review and approval. The project owner shall implement site security measures that address physical site security and hazardous materials storage. The level of security to be implemented shall not be less than that described below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. Permanent full perimeter fence or wall, at least eight feet high around the ~~Power Block and~~ Solar Field;
2. Main entrance security gate, either hand operated or motorized;
3. Evacuation procedures;
4. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;
5. Written standard procedures for employees, contractors, and vendors when encountering suspicious objects or packages on site or off site;
6. A. a statement (refer to sample, **ATTACHMENT A**), signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to determine the accuracy of employee identity and employment history and shall be conducted in accordance with state and federal laws regarding security and privacy;

   B. a statement(s) (refer to sample, **ATTACHMENT B**), signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner), that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractors who visit the project site;

7. Site access controls for employees, contractors, vendors, and visitors;

8. **If required by law,** ~~A~~ a statement(s) (refer to sample, **ATTACHMENT C**), signed by the owners or authorized representative of hazardous materials transport vendors, certifying that they have prepared and implemented security plans in compliance with 49 CFR 172.802, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

9. Closed circuit TV (CCTV) monitoring system, recordable, and viewable in the **O & M Building** ~~power plant control room and security station (if separate from the control room)~~ with cameras able to pan, tilt, and zoom, have low-light capability, and are able to view the outside entrance to the **O & M Building** ~~control room~~, and the front gate. ~~; and~~

~~10. Additional measures to ensure adequate perimeter security consisting of either:~~

~~A. security guard(s) present 24 hours per day, 7 days per week; or~~

~~B. power plant personnel on site 24 hours per day, 7 days per week, and~~

~~one of the following:~~

~~perimeter breach detectors~~

~~**or**~~

~~CCTV able to view both site entrance gates and 100% of the power block area perimeter.~~

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to those security plans. The CPM may authorize modifications to these measures, or may require additional measures such as protective barriers for critical power plant components depending upon circumstances unique to the facility or in response to industry-related standards, security concerns, cyber security, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Corporation, after consultation with both appropriate law enforcement agencies and the applicant.

Verification: At least 30 days prior to the initial receipt of **operations-related** hazardous materials on site, the project owner shall notify the CPM that a site-specific operations site security plan is available for review and approval. In the annual compliance report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and that updated certification statements have been appended to the operations security plan. In the annual compliance report, the project owner shall include a statement that the operations security plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

SAMPLE CERTIFICATION (Attachment A)

Affidavit of Compliance for Project Owners

I,

____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

____

(Company name)

for employment at

____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

____

(Signature of officer or agent)

Dated this ____________________ day of ____________________, 20 ________.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment B)

Affidavit of Compliance for Contractors

I,

____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

____

(Company name)

for contract work at

____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

____

(Signature of officer or agent)

Dated this ____________________ day of ____________________, 20 _______.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

____

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.880 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

____

(Company name)

for hazardous materials delivery to

____

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

____

(Signature of officer or agent)

Dated this ____________________ day of ____________________, 20 _______.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

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HAZARDOUS MATERIALS
APPENDIX A

Hazardous Materials Proposed for Use
at the
Modified Blythe Solar Power Project

Hazardous Materials Appendix A
Hazardous Materials Proposed for Use at the BSPP

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Acetylene	74-86-2	Welding gas	Health: moderate toxicity Physical: combustible, flammable	600 cubic feet total	10,000 pounds
Activated Carbon	7440-44-0	Control of VOCs from HTF expansion tank	Health: non-toxic (when unsaturated), low to moderate toxicity when saturated, depending on the absorbed material Physical: combustible solid	4,000 pounds	N/A
Argon	7440-37-1	Welding gas	Health: low toxicity Physical: non-flammable gas	600 cubic feet	N/A
Sodium Hypochlorite 12.5%	7778-54-3	Water treatment	Health: moderate toxicity Physical: corrosive, irritant	Minimal on-site storage for water treatment, not expected to exceed 50 pounds	
Carbon Dioxide	124-38-9		Health: low toxicity Physical: nonflammable gas	15 tons	N/A
Diesel Fuel	68476-34-6		Health: low toxicity Physical: combustible liquid	3600 gallons	N/A
Herbicides: Roundup® Triclopyr Glyphosate			Health: low toxicity Physical: irritant	No on-site storage, brought on site by licensed contractor, used immediately	N/A
Hydraulic Fluid	64741-89-5		Health: low to moderate toxicity Physical: Class IIIB combustible liquid	500 gallons in equipment, maintenance inventory of 110 gallons in 55-gallon steel drums	N/A
Lube Oil	64742-65-0		Health: low toxicity Physical: N/A	maintenance inventory of up to 550 gallons in 55-gallons steel drums	N/A
Mineral Insulating Oil	8042-47-5		Health: low toxicity Physical: N/A	250,000 gallons	N/A

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Sulfur Hexaflouride		230 kV breaker insultating medium	Health:	Contained within switchyard equipment; max of 7500 pounds	N/A
Oxygen	7782-44-7	Welding gas	Health: low toxicity Physical: oxidizer	600 cubic feet	NA
Oxygen Scavenger Reagent Sodium Hydroxide (50%)	64-19-7 1310-73-2	Water treatment	Health: moderate toxicity Physical: corrosive, irritant	Minimal on-site storage for max 1000 gallons on-site in 4 x 250 gallon totes	5,000 pounds
Soil Stabilizer Active Ingredient: acrylic or vinyl acetate polymer or equivalent	N/A		Health: non-toxic Physical: N/A	No on-site storage, supplied in 55 gallon drums or 400-gallon totes, used immediately	N/A
Sulfuric Acid (29.5%)	7664-93-9	water treatment	Health: high toxicity Physical: corrosive and water reactive	max 1000 gallons on-site in 4 x 250 gallon totes	1,000 pounds
Anti-scalant		water treatment		max 500 gallons on-site in 2 x 250 gallon totes	
Corrosion inhibitor		water treatment		max 500 gallons on-site in 2 x 250 gallon totes	
Biocide Magnesium Nitrate (1-5%) 5-chloro-2-2methyl-4-isothiazolin-3-one (1-5%) 2-methyl-4-isothiazolin-3-one (0.1-1%)	 10377-60-3 26172-55-4 2682-20-4	water treatment		max 500 gallons on-site in 2 x 250 gallon totes	 100 pounds N/A

Source: Table 2-7 of the Revised Petition to Amend (NEBSEC2013a), and Table 4 of the Response to Data Request Set 1 (NEBSEC2013e)
a. Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

LAND USE

Michael C. Baron

THIS SECTION WILL BE PROVIDED IN THE

STAFF ASSESSMENT – Part B

NOISE AND VIBRATION

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The power blocks, the air-cooled condensers, and associated thermal-power equipment are the main sources of noise and vibration impacts for the approved project. By eliminating the parabolic trough technology (and, thus, these components) and replacing it with the photovoltaic (PV) technology, the modified project would not generate substantial noise during project operations. Also, the project's footprint has been modified and the nearest noise-sensitive receptor (a single-family residence labeled LT) would be much further away from the modified project site boundary than the approved project.

Considering the substantially lower operational noise levels expected from the modified project as opposed to the approved project, the California Energy Commission (Energy Commission) staff (staff) believes that Condition of Certification **NOISE-4** is no longer necessary. **NOISE-4** requires a community noise survey to ensure that the power plant equipment does not exceed a certain level of noise or cause certain types of noise (non-pure tone components). This condition requires an extensive effort to implement, and since the project would most likely not even affect the existing noise level at LT, this condition would not be necessary.

Due to the substantially lower operational noise exposure levels to workers from the modified project, as compared to the approved project, staff believes an occupational noise survey is no longer required and, thus, has deleted **NOISE-5** (Occupational Noise Survey).

Also, due to the elimination of the steam turbines and associated piping, staff has deleted Condition of Certification **NOISE-7**, which required mitigation if high pressure steam blows were needed prior to operation of the steam turbine and piping.

Construction-related noise and vibration impacts would also be less than the approved project due to substantially less grading and other construction activities, the elimination of the concrete batch plant previously proposed for the approved project, and the further distance between project construction and LT. Nevertheless, because construction may involve heavy equipment and noisy activities, the conditions of certification related to construction remain unchanged.

Because construction and operational noise impacts would be less than those from the approved project, the modified Blythe Solar Power Project (BSPP), if built and operated in conformance with the proposed conditions of certification, 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 proposed conditions of certification provide appropriate mitigation, in the form of good design practice and selection of appropriate project equipment that would avoid any significant adverse impacts.

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 modified BSPP project, compare those impacts to the licensed thermal 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** at the end of this section.

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.

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.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

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)

[1] Noise that draws legitimate complaint (for the definition of “legitimate complaint”, see footnote 2A below).

[2A] A legitimate complaint refers to a complaint about noise that is caused by the BSPP project as opposed to another source (as verified by the CPM). A legitimate complaint constitutes a violation by the project of any noise condition of certification (as confirmed by the CPM), which is documented by an individual or entity affected by such noise.

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** at the end of 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.

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, that 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 five 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**).

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 (L_{dn}) or CNEL as "normally acceptable" and up to 70 dBA L_{dn} 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 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.

PROPOSED MODIFIED PROJECT

The modified BSPP includes replacing the solar thermal technology with the PV technology and reducing the physical size of the project. Linear access to the site would be the same as the approved BSPP, and the modified BSPP would interconnect to the regional transmission grid via the same proposed gen-tie line to Southern California Edison's (SCE's) Colorado River Substation, which is currently under construction.

The power blocks, including the air-cooled condensers and associated thermal-power equipment, are the main sources of noise and vibration impacts for the approved project. By eliminating the parabolic trough technology (and thus, these components) and replacing it with the PV technology, the modified project would not generate substantial noise during project operations. Also, the project's footprint has been modified and LT (the nearest noise-sensitive receptor) would be much further away from the modified project site boundary than the approved project. Finally, the trough mirrors would have had larger tracking motors than the PV panels; further noise reduction would be realized due to this. Therefore, significantly lower noise levels from the modified project would be heard as opposed to the approved project.

Construction-related noise and vibration impacts would also be less than the approved project due to substantially less grading and other construction activities, the elimination of the concrete batch plant previously proposed in the approved project, and the further distance between project construction and LT.

SETTING AND EXISTING CONDITIONS

The modified BSPP would be constructed approximately eight miles northwest of the City of Blythe in Riverside County, California. The total area to be disturbed by construction of the proposed project is approximately 4,070 acres. The proposed project site is located approximately 2 miles north of U.S. Interstate-10 (I-10).

The modified BSPP site is located in the Colorado Desert in eastern Riverside County. Most of the surrounding land is covered by desert scrub. The significant noise source in the project area is vehicle traffic on I-10. Secondary noise sources include aircraft operations associated with the Blythe Airport, agricultural operations, the Blythe Skeet and Trap Shooting Club, and individual vehicles operating on surrounding local roadways.

The land use of the modified BSPP site is undeveloped open space, and the surrounding land uses include undeveloped land and a small developed private parcel to the southwest. Noise levels at the nearest residence are dominated by wind, which ebbs and flows throughout the day as the air temperatures climb and drop.

The only identified sensitive noise receptors in the vicinity of the project includes a mobile home located approximately 2,500 feet west of the nearest project site boundary.

Ambient Noise Monitoring

In order to establish a baseline for the comparison of predicted project noise with existing ambient noise, the project owner presented the results of an ambient noise survey in the original AFC (Solar Millennium 2009a, AFC § 5.8.2.4; Tables 5.8-5, 5.8-6). Ambient noise levels were measured at the boundary of the approved BSPP site and nearest residence on June 2 to June 4, 2009. Because the noise environment is still the same, a new ambient noise survey is not necessary, and staff uses the 2009 survey to evaluate the noise impacts of the modified project at the project’s noise-sensitive receptor. One long-term measurement was taken at the nearest residence over a continuous period between 2:00 p.m., June 2, and 1:00 p.m., June 4, 2009. The survey was performed using acceptable equipment and techniques. The noise survey monitored existing noise levels at or near the nearest sensitive receptor, a single-family residence labeled LT:

1. Location LT: Near the closest residence to the project site. This is a single-family residence located approximately 2,500 feet southwest of the nearest project site boundary.

NOISE Table 2 summarizes the ambient noise measurements (Solar Millennium 2009a, AFC § 5.8.2.4; Tables 5.8-5, 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_{90}/L_{eq}
LT, Nearest Residence at 2,500 feet	45[1]	36[2]

Source: Solar Millennium 2009a, AFC § 5.8.2.4; Tables 5.8-5, 5.8-6

1. Staff calculations of average of the daytime hours
2. Staff calculations of average of the nighttime hours. The nighttime L_{eq} and the corresponding L_{90} values are equal (AFC § 5.8.2.4, p. 5.8-10); this is likely due to the proximity of the project site to I-10 (nighttime noise is likely dominated by the relatively steady noise from I-10).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

DIRECT AND INDIRECT 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 modified BSPP project is expected to be typical of similar PV projects in terms of equipment used and other types of activities.

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.

For the approved project, employing the parabolic trough technology, the project owner predicted a construction noise level of 61 dBA at the nearest residential receptor, LT. 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
LT	61	45	61	+16

Sources: [1] Solar Millennium 2009a, AFC § 5.8.3.1
[2] NOISE Table 2, above

For the modified project, construction-related noise and vibration impacts would be less than the approved project due to substantially less grading and other construction activities, the elimination of the concrete batch plant previously proposed in the approved project, and the further distance between project construction and LT.

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 project owner would perform 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. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

Therefore, the noise impacts of the modified BSPP 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. As seen in **NOISE Table 3** above, last column, construction noise from the approved project would elevate the existing ambient noise level at LT by 16 dBA, a considerable increase. Due to substantially less grading and other construction activities, the elimination of the concrete batch plant, and the further distance between project construction and LT, this impact would be substantially reduced. Secondly, even though project construction would likely last 48 months, the construction activities within an area that would potentially considerably impact the nearest residential receptor would not last more than several months, and therefore, construction impacts at LT are considered temporary. Finally, construction activities would be limited to the daytime hours. Therefore, the noise effects of plant construction are considered to be less than significant at the above receptor.

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 modified BSPP 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 two or three minutes each, are performed several times daily over a period of two or three weeks. At the end of this procedure, the steam lines are connected to the steam turbine, which is then ready for operation.

The original licensed project required steam blows which can be quite loud and have the potential to cause annoyance. However, for the modified project, steam turbines and associated piping would not be installed. Thus, there would be no impacts associated with steam blows. Accordingly, staff has deleted Condition of Certification **NOISE-7**, which requires mitigation if high pressure steam blows are needed prior to operation of the steam turbines and associated piping.

Linear Facilities

There is no change to the linear facilities from the original licensed project therefore staff proposes the existing Condition of Certification **NOISE-6**.

Vibration

The only construction activity likely to produce vibration that could be perceived off-site would be pile driving. Pile driving would not be required for construction of the modified BSPP project. Therefore, no vibration impacts are expected.

Worker Effects

The project owner must protect construction workers from noise hazards and adapt applicable LORS that would protect construction workers. 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 sources of the approved BSPP project are the power blocks, where the steam turbine generators, air-cooled condensers, and various pumps and fans would be located. The modified project, however, would not employ any of these noise sources. The only notable noise sources of a PV power plant are inverters and electric transformers. National Electrical Manufacturers Association (NEMA) standards provide maximum sound levels from various equipment arrays. According to NEMA, a transformer (comparable in size to that used for a typical PV plant) has an average sound level of 71 dBA which is approximately the sound level one would expect from a vacuum cleaner at 10 feet; this is equivalent to roughly 50 dBA at approximately 200 feet (also see **NOISE Table A2**).

A recent study measured noise levels at set distances from the inverters and from the outer boundary of three ground mounted PV arrays in Massachusetts with a capacity range of 1 to 3.5 MW (Massachusetts DOE 2012). Close to the inverters (at 10 feet), sound levels varied from an average of 55 dBA to 65 dBA. Sound levels along the fenced boundary of the PV arrays were generally at background levels, though a faint inverter hum could be heard at some locations. Any sound from the PV array and equipment was inaudible and sound levels were at background levels at setback distances of 50 to 150 feet from the boundary.

The project would utilize one transformer and one inverter at approximately the center of each inverter block. Each of these blocks would occupy approximately 8 acres of land; a relatively large expanse of land. Thus, at the edge of each block, the sound energy from all the surrounding blocks would dissipate to no more than that from one block and thus, the additive noise effect of all the blocks can be assumed to be equal to that of an individual inverter/transformer set, that is, 50 dBA at 200 feet. Staff has used this value to evaluate the project's impact at LT (please see below).

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.

Compliance with LORS

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. As explained above, a maximum noise level of 50 dBA at 200 feet is expected from the modified BSPP. This results in roughly 30 dBA at LT. This level of noise is expected during project operations, which would occur in the daylight hours (when the sun is shining). This level is well below the above LORS daytime threshold of 55 dBA.

Operations would cease at night and the plant would generate no measurable noise at LT. Thus, the project would comply with the nighttime LORS threshold of 45 dBA.

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 (L_{dn}) or CNEL (Community Noise Equivalent Level) to be normally acceptable.

Therefore, the modified BSPP project would comply with the applicable noise LORS. In the unlikely event project noise causes annoyance, staff's proposed Conditions of Certification **NOISE-1** and **NOISE-2** establish a public notification and noise complaint process requiring the project owner to resolve any problems caused by operational noise.

CEQA Impacts

The modified BSPP project would operate during the daylight hours. 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 power blocks, including the air-cooled condensers and associated thermal-power equipment, are the main sources of noise and vibration impacts for the approved project. By eliminating the parabolic trough technology (and, thus, these components) and replacing it with the PV technology, the modified project would not generate substantial noise during project operations. Also, the project's footprint has been modified and LT (the nearest noise-sensitive receptor) would be much further away from the modified project site boundary than the approved project. Finally, the trough mirrors would have larger tracking motors than the PV panels; further noise reduction would be realized due to this. Therefore, significantly lower noise levels from the modified project would be heard as opposed to the approved project.

As explained above, a maximum noise level of 71 dBA at 10 feet, or 50 dBA at 200 feet, is expected from the modified BSPP. This translates to roughly 30 dBA at LT. This is considerably lower than the noise level of 40 dBA expected for the approved project at LT (Solar Millennium 2009a, AFC § 5.8.3.2). It is also 15 dBA below the existing ambient level of 45 dBA at this location (see **NOISE Table 2** above); the project would be inaudible at LT.

Considering these factors, staff believes that Condition of Certification **NOISE-4** is no longer necessary. **NOISE-4** requires a community noise survey to ensure that the power plant does not exceed a certain level of noise or cause certain types of noise (non-pure tone components). This condition requires an extensive effort to implement, and the project would most likely not even affect the existing noise level at LT. Thus, staff has deleted this condition of certification.

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 for the approved project at LT was 20 dBA (Solar Millennium 2009a, AFC § 5.8.3.2). This is significantly lower than the average nighttime ambient noise level of 36 dBA at LT (**NOISE Table 2**, above). The mirror solar collectors would have to be cleaned once or twice per week, determined by the reflectivity monitoring program. This mirror washing operation would be done at night and involve a water truck spraying treated water on the mirrors in a drive-by fashion. On the other hand, the modified project is only proposed to perform washing of the PV panels twice per year, once in the spring and once in the fall. Thus, the average nighttime noise level at LT resulting from the modified project would be even lower than 20 dBA. Therefore, the project's nighttime activities would have a less-than-significant impact on the project's noise-sensitive receptor.

In the unlikely event project noise causes annoyance, staff's proposed Conditions of Certification **NOISE-1** and **NOISE-2** establish a public notification and noise complaint process requiring the project owner to resolve any problems caused by operational noise.

Linear Facilities

All water 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 approved BSPP plant would consist of high-speed steam turbine generators and various pumps and fans, which could cause vibration if not carefully balanced in order to operate. For the modified project, these major sources of vibration would be eliminated and therefore, there would be no detectable ground-borne vibration from the modified BSPP.

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 modified BSPP would cause perceptible airborne vibration effects at any offsite noise-sensitive receptor.

Worker Effects

For the approved project, the project owner acknowledged the need to protect plant operating and maintenance workers from noise hazards and it committed to compliance with all applicable LORS (Solar Millennium 2009a, AFC § 5.8.4), including posting warning signs in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing) and requiring hearing protection. To ensure this, staff proposed Condition of Certification **NOISE-5** (occupational noise survey) for the approved project. **NOISE-5** required an occupational noise survey to determine if workers would be exposed to noise levels exceeding 85 dBA for an extended period of time, and if so, it required the project owner to adequately mitigate the impacts.

The modified project's noisiest equipment, the inverters and transformers, would generate noise levels considerably lower than 85 dBA, likely in the range of 55-71 dBA at a distance of 10 feet. Thus, staff believes an occupational noise survey is not required for the modified project and, thus, it has deleted **NOISE-5**.

Facility Closure

All operational noise from the project would cease when the BSPP project closes, and no further adverse noise impacts 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.

CUMULATIVE IMPACTS

There are no new projects or new "reasonably foreseeable probable future projects" within a distance that would cause cumulative noise and vibration impacts when combined with the modified project. The McCoy Solar Energy Project, the nearest project to BSPP, would be a 750 MW solar PV project that would be located north/northwest of the BSPP site. It would be approximately 2.5 miles from LT (south/southwest of the BSPP site); too far to create a cumulative noise impact at LT, when combined with BSPP.

Furthermore, the change in technology (from parabolic trough to PV) will not result in cumulative impacts that were not analyzed in the original project.

NOTEWORTHY PUBLIC BENEFITS

The proposed project would not affect the ambient noise levels in the project area. While the project would not affect the existing noise regime, development of the proposed project would not result in any noteworthy public benefits as related to sound.

PUBLIC AND AGENCY COMMENTS

Staff received no public or agency comments related to Noise and Vibration.

CONCLUSIONS

The power blocks, the air-cooled condensers, and associated thermal-power equipment are the main sources of noise and vibration impacts for the approved project. By eliminating the parabolic trough technology (and, thus, these components) and replacing it with the photovoltaic technology, the modified project would not generate substantial noise during project operations. Also, the project’s footprint has been modified and the nearest noise-sensitive receptor (LT) would be much further away from the modified project site boundary than the approved project.

Considering the substantially lower operational noise levels expected from the modified project as opposed to the approved project, staff believes that Condition of Certification **NOISE-4** is no longer necessary. **NOISE-4** requires a community noise survey to ensure that the power plant equipment does not exceed a certain level of noise or cause certain types of noise (non-pure tone components). This condition requires an extensive effort to implement, and since the project would most likely not even affect the existing noise level at LT, this condition would not be necessary.

Due to the substantially lower operational noise exposure levels to workers from the modified project, as compared to the approved project, staff believes an occupational noise survey is no longer required and, it thus, has deleted **NOISE-5** (Occupational Noise Survey).

Also, due to the elimination of the steam turbines and associated piping, staff has deleted Condition of Certification **NOISE-7**, which required mitigation if high pressure steam blows were needed prior to operation of the steam turbine and piping.

Construction-related noise and vibration impacts would also be less than the approved project due to substantially less grading and other construction activities, the elimination of the concrete batch plant previously proposed for the approved project, and the further distance between project construction and LT. Nevertheless, because construction may involve heavy equipment and noisy activities, the conditions of certification related to construction remain unchanged.

Because construction and operational noise impacts would be less than those from the approved project, the modified BSPP, if built and operated in conformance with the following conditions of certification, 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 following conditions of certification provide appropriate mitigation, in the form of good design practice and selection of appropriate project equipment that would avoid any significant adverse impacts.

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 one 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 five 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 three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is performed and complete.

EMPLOYEE NOISE CONTROL PROGRAM - CONSTRUCTION

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 49 dBA L_{eq} measured at or near monitoring location LT.~~

~~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 LT, 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 During project construction, heavy equipment operation and noisy construction work relating to any project features within ¼ mile of an existing residence shall be restricted to the times delineated below, unless the CPM approves an alternate work schedule:

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 one 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.~~

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Blythe Solar Power Project (09-AFC-6C)
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).

REFERENCES

Massachusetts DOE 2012 – Massachusetts department of Energy's Clean Energy Results, Ground-Mounted Solar Photovoltaic Systems, p.18.

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 Volume 1 & 2, dated 8/24/2009.

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 seven 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 (often used for an existing or pre-project noise condition for comparison study).
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		PainThreshold
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'), Large Transformer (200')	50	Private Business Office	
Bird Calls	40	Public Library	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 three dB change is considered a barely noticeable difference.
3. A change in level of at least five dB is required before any noticeable change in community response would be expected.
4. A ten 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 three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three 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 C.F.R. § 1910.

PUBLIC HEALTH

Testimony of Huei-An (Ann) Chu, Ph.D.

SUMMARY OF CONCLUSIONS

Energy Commission staff (staff) has analyzed potential public health risks associated with construction and operation of the Blythe Solar Power Project (BSPP) and does not expect there would be any significant adverse cancer, or short- or long-term non-cancer health effects from project toxic air emissions. Staff's analysis of potential health impacts from the proposed BSPP project 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 of toxic air contaminants (TACs) from BSPP would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

INTRODUCTION

On April 12, 2013, NextEra Blythe Solar Energy Center, LLC (NextEra Blythe Solar) filed a revised Petition to Amend with the Energy Commission requesting to modify the BSPP Final Decision. The project was licensed by the Energy Commission as a 1,000-megawatt (MW) solar thermal power-generating facility utilizing parabolic trough technology. The modifications proposed in the April 2013 revised petition to amend would replace the solar thermal technology entirely with photovoltaic (PV) generating technology, reduce the physical size of the BSPP, and reduce the amount of generated electricity. NextEra Blythe Solar proposes to develop the BSPP in four phases designed to generate a total of approximately 485 MW (nominal) of electricity when completed.

The purpose of this Staff Assessment (SA) is to determine if emissions of toxic air contaminants (TACs) from the proposed BSPP 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 would evaluate mitigation measures to reduce such impacts to insignificant levels.

In addition to the analysis contained in this **PUBLIC HEALTH** 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 impacts from the proposed BSPP 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 BSPP 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;
- Socioeconomics and Environmental Justice - evaluates project-induced changes on community services including law enforcement and hospitals;

- Soil and Water Resources – evaluates the potential for BSPP 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 - assesses the worker safety and fire protection measures proposed by the project owner 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; and,
- 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.

METHODOLOGY AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

METHODOLOGY

The analysis of proposed BSPP effects must comply with the California Environmental Quality Act (CEQA), which requires that the significance of individual effects be determined by the Lead Agency, in this case the California Energy Commission.

CEQA also 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” (CEQA Guidelines Section 15382).

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. The analysis includes staff’s evaluation of the environmental effects of the proposed BSPP on land uses (i.e. rural land and desert around the site).

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 (HRA) is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The standard approach currently used for HRA involves four steps: 1) hazard identification; 2) exposure assessment; 3) dose-response assessment; and 4) risk characterization. These four steps are briefly discussed below (OEHHA, 2003).

First, hazard identification is conducted to determine the potential health effects that could be associated with project emissions. For air toxics sources, the main purpose is to identify whether or not a hazard exists. If this hazard exists, staff evaluates the exact toxic air contaminant(s) of concern and whether a TAC is a potential human carcinogen or is associated with other types of adverse health effects.

Second, an exposure assessment is conducted to estimate the extent of public exposure to project emissions, including: (1) the worst-case concentrations of project emissions in the environment using dispersion modeling; and, (2) the amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact. Therefore, this step involves emissions quantification, modeling of environmental transport and dispersion, evaluation of environmental fate, identification of exposure routes, identification of exposed populations and sensitive subpopulations, and an estimation of short-term and long-term exposure levels.

Third, a dose-response assessment is conducted to characterize the relationship between exposure to an agent and the incidence of an adverse health effect in exposed populations. The assumptions and methodologies of a dose-response assessment are different between cancer and noncancer health effects. In carcinogenic risk assessment, the dose-response relationship is expressed in terms of a potency (or slope) factor that is used to calculate the probability of getting cancer associated with an estimated exposure. It is assumed in cancer risk assessments that risk is directly proportional to dose and that there is no threshold for carcinogenesis below which there is no risk. In non-carcinogenic risk assessment, dose-response data developed from animal or human studies are used to develop acute and chronic noncancer Reference Exposure Levels (RELs). The acute and chronic RELs are defined as the concentration at which no adverse noncancer health effects are anticipated. Unlike cancer health effects, noncancer acute and chronic health effects are generally assumed to have thresholds for adverse effects. In other words, acute or chronic injury from a TAC would not occur until exposure to the pollutant has reached or exceeded a certain concentration (i.e., threshold).

Finally, risk characterization is conducted to integrate the health effects and public exposure information and to provide quantitative estimates of health risks resulting from project emissions. Staff characterizes potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff conducts its public health analysis by evaluating the information and data provided in the petition by the project owner. If staff thinks the information and data provided by the project owner is appropriate, we adopt it. If staff thinks the additional information and data is needed, we ask the project owner to provide it or do the additional analyses ourselves. Staff also relies upon the expertise of the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) to (1) identify contaminants that are known to the state to cause cancer or other noncancer health effects; and, (2) identify the toxicity and cancer potency factors of these contaminants. Staff relies upon the expertise of the California Air Resources Board (ARB) and the local air districts to conduct ambient air monitoring of toxic air contaminants and the California Department of Public Health to conduct epidemiological investigations into the impacts of pollutants on communities.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward the 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 would be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, 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 that 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 would, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities[1] 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 multi-pathway substances are present in facility emissions, the screening level analysis includes the following additional

[1] For BSPP, as discussed in a later section, the major health effects pathway is inhalation (of Diesel Particulate Matter during construction). However, some high-performance solar PV cells are known to contain small amounts of cadmium, selenium, and arsenic. If any solar cells were to be broken, small quantities of these substances could be emitted into the air, then enter the soil and ground water. The quantities likely to be emitted are small and the chance of breakage under normal project operations is low but is still possible.

exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The health risk assessment process for this project addresses three categories of health impacts: (1) acute (short-term) health effects; (2) chronic (long-term) noncancer effects; and, (3) cancer risk (also long-term).

Acute Noncancer Health Effects

Acute noncancer health effects are those that result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Such effects include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic Noncancer Health Effects

Chronic noncancer health effects are those that result from long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 12 percent to 100 percent of a lifetime, or from 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 the analysis 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, and 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.

Cancer Risk and Estimation Process

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 terms of chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant would 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 and cancer (long-term) risk. 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 relies 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 Mojave Desert Air Quality Management District (MDAQMD) in Rule 1320 (Solar Millennium 2009a, Section 5.10.3.1).

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 could be ensured. Staff’s analysis also addresses potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of 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 air toxics being analyzed. When a screening analysis shows cancer risks to be above the significance level, refined assumptions are applied for what would likely be a lower, more realistic risk estimate. If after refined assumptions, the project’s risk is still found to exceed the significance level of 10 in 1 million, staff would require appropriate mitigation measures to reduce the risk to less than significance levels. If, after all feasible risk reduction measures have been considered and a refined analysis still identifies a cancer risk greater than 10 in 1 million, staff would deem such risk to be significant and would not be able to recommend approval of the project as proposed at that site.

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.
State	
California Health and Safety Code section 25249.5 et seq. (Proposition 65)	These sections establish thresholds of exposure to carcinogenic substances above which Proposition 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 local air pollution control 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 ARB/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	
Mojave Desert Air Quality Management District (MDAQMD) 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.
MDAQMD Regulation X Emission Standards for Additional Specific Air Contaminants	Provides notice to the regulated community that California Air Toxic Control measures (ATCMs) are enforceable by the MDAQMD within its jurisdiction and federal maximum achievable control technology (MACT) and NESHAPS are adopted by reference and enforced by the MDAQMD.
MDAQMD Rule 1320	Requires the use of best available control technology (BACT) and best available control technology for toxics (T-BACT) at certain projects and the preparation of an HRA.
MDAQMD Rule 1520	Implementation of HSC Section 44300 et seq., Air Toxics "Hot Spots" Information and Assessment Act.

PROPOSED MODIFIED PROJECT

As noted previously, the modification of BSPP proposes replacing the solar thermal technology entirely with PV generating technology. The modified BSPP would consist of four operational phases and associated facilities designed to generate a total of approximately 485 MW of electricity, reduced from the 1,000 MW capacity of the approved facility.

In summary, the primary modifications to the already-approved Blythe Solar Power Project (BSPP) related to Public Health are as follows (NEBS 2013a, Section 1, Section 4.2.1 and Section 4.3.1):

- The electrical generating technology has been converted from a concentrating solar thermal collection (CSP) and steam turbine technology to PV solar technology. More specifically, the parabolic trough energy collection systems and associated heat transfer fluid (HTF) piping systems have been eliminated and replaced with PV panels configured for either horizontal tracking or fixed-tilt operations;
- The previously planned four power blocks (which each included a steam turbine, evaporation pond, auxiliary boiler, air-cooled condenser, and equipment) and structures have been eliminated;
- The auxiliary boilers which burn natural gas and are used for freeze protection of the HTF and cold startup of the steam generators will no longer be needed;
- Emergency generators and fire water pump engines which burn diesel fuel are no longer planned;
- PV panels require much less frequent washing (e.g., at most quarterly) rather than the intensive weekly mirror washing program;
- The Land Treatment Units for HTF have been eliminated;
- The concrete batch plant has been eliminated;
- The amount of mass grading has been greatly reduced. The area disturbed has been reduced from 6,831 acres to 4,070 acres. The cut and fill amount has been reduced from approximately 8.3 million cubic yards to approximately 0.9 million cubic yards;
- The construction period has been reduced from 69 months to up to 48 months;
- As described in **AIR QUALITY** section, construction emissions would be reduced from the approved configuration by 25% for PM10 and 50% for PM2.5, and operation emissions would be reduced from the approved configuration by over 90%; and
- A reduction in the construction workforce from an average of approximately 604 daily construction workers, with a peak daily workforce of 1,004, to an average of 250 to 430 daily construction workers, with a peak daily workforce of 619.

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 8 miles west of Blythe and 3 miles north of Interstate 10 (I-10). Lands in the vicinity of the project consist predominantly of open desert and agricultural lands, with the exception of the Blythe Airport, located about one mile southeast of the site boundary. The topography of the site is mostly flat (ranges between 420 and 670 feet above sea level), with elevated terrain existing to the west and southwest within 1-2 miles of the site (Solar Millennium 2009a, Section 2.4.1 and Figure 1-2, NEBS 2013a, Section1).

The general population of California 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 6-mile buffer zone of the project site. The nearest sensitive receptor is the Palo Verde High School located about 7 miles east of the project site and the nearest residence is located adjacent to the project boundary on a private parcel (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 and 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 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), where 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 Mojave Desert Air Quality Management District. 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. When examining such risk estimates, staff considers it important to note that the overall lifetime risk of developing cancer for the average female in the United States is about 1 in 3, or 333,333 in 1 million and about 1 in 2, or 500,000 in 1 million for the average male (American Cancer Society, 2012). From 2004 to 2008, the cancer incidence rates in California are 51.28 in 1 million for males and 39.69 for females. Also, for the year 2004, the American Cancer Society estimated that the death rate due to cancer was 23.1 percent, about 1 in 4. From 2004 to 2008, the cancer death rates for California are 19.74 in 1 million for males and 14.34 in 1 million for females (American Cancer Society, 2012).

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 (ARB) air toxics monitoring station that actively reports values is located in Calexico, approximately 80 miles southwest of the project site. Staff does not consider this location to be representative of air quality in the area of the proposed site because emissions of toxic substances in Calexico are much greater than emissions in the vicinity of the project. However, data from Calexico serve to show the upper-bound levels of toxic air contaminants found in the general region. In 2008, the background cancer risk calculated by ARB for the Calexico monitoring station was about 135 in one million (ARB 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 one million, while the risk from benzene was about 44 in one million. Formaldehyde accounted for about 13 percent of the 2008 average calculated cancer risk based on air toxics monitoring results, with a risk of about 18 in one million. Formaldehyde is emitted directly from vehicles and other combustion sources. The risk from hexavalent chromium was about 14 in one million, or ~10 percent of the total risk.

The use of reformulated gasoline, beginning in the second quarter of 1996, and 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 one million based on 1992 data and in 2002, the average inhalation cancer risk decreased to 162 in one 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 the fact that no existing health concerns (see below for Valley Fever) within a 6-mile buffer zone of the project, staff has concluded that an analysis of existing public health issues was not needed.

BSPP is proposed at a location where the fungus that causes Valley Fever[2] (*Coccidioidomycosis)* may occur naturally. It was reported by the Desert Sun newspaper in a February 23, 2011 article that Riverside County saw an increase in one year in Valley Fever cases, from 67 to 106 cases, which is a 58 percent jump in the number of Valley Fever cases in 2010. The increase might be due to heavy spring rains followed by dry summers and a windy autumn, or because of a change in state reporting in 2010[3] (The Desert Sun, 2011).

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 (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 & Appendix I).

To address the possibility that soil contamination would be encountered during construction of the BSPP, existing conditions **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 would 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.

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[2] Valley Fever is an infection that occurs when the spores of the fungus *Coccidioides immitis* enter human’s through inhalation. When people breathe in these *Coccidioides* spores, they are at risk of developing Valley Fever.

[3] Valley Fever (*Coccidioidomycosis*) became laboratory-reportable in California in 2010 (Hector el al., 2011). California Code of Regulations, Title 17, Section 2505 requires laboratories to report laboratory testing results suggestive of the disease of Valley Fever (*Coccidioidomycosis*) to the local health department. Source: http://www.cdph.ca.gov/HealthInfo/Documents/TITLE_17_SECTION_2505.pdf

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

CONSTRUCTION IMPACTS AND MITIGATION

Compared to the approved BSPP, emissions during the construction period of the proposed BSPP are substantially reduced due to the following factors (NEBS 2013a, Section 4.2.1):

- The project footprint is reduced from 6,831 acres to 4,070 acres;
- The length of the time needed for construction is decreased from 69 months to up to 48 months;
- Since PV panels do not require a nearly flat surface, substantially less grading of the project footprint is planned;
- The cut and fill amount is reduced from approximately 8.3 million cubic yards to approximately 0.9 million cubic yards;
- The project will not utilize an on-site concrete batch plant or fuel depot (diesel fuel will be obtained from fueling trucks brought on-site and gasoline will be obtained from a nearby gasoline station in Blythe); and
- A natural gas pipeline will not be constructed.

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), and diesel exhaust from heavy equipment. 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 would 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 ARB as toxic air contaminants. Diesel exhaust is also characterized by ARB as "particulate matter from diesel-fueled engines."

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased coughing, 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. Diesel exhaust is listed by the EPA as "likely to be carcinogenic to humans (US.EPA, 2003)"

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 Methodology 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 (OEHHA 2009, Appendix A). In 2000, ARB developed a "Risk Reduction Plan to Reduce Particulate Matter Emissions From Diesel-Fueled Engines and Vehicles" and has been developing regulations to reduce diesel particulate matter emissions since that time.

Construction of the BSPP, including site preparation, is anticipated to take place over a period of 48 months (NEBS 2013a, Section 4.3). 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.

Project Owner Analysis

The project owner conducted a screening health risk assessment for diesel exhaust from construction activities and the results are listed in the upper portion of **Public Health Table 2**. The project owner did not run the Hotspots Analysis Reporting Program (HARP) model to evaluate construction-related public health impacts, but rather took two locations with the maximum concentrations (i.e. fence line receptor and nearest residential receptor) from diesel PM modeling and calculated the results in Excel (NEBS 2013a, Section 4.3.2). The maximum modeled annual average concentration of diesel particulate matter calculated by the project owner was 0.00303 $\mu g/m^3$ for the fence line receptor and 0.00006 $\mu g/m^3$ for the nearest residential receptor. The calculated cancer risk is approximately 0.473 in one million for the fence line receptor and 0.0092 in one million for the nearest residential receptor, both below the significance level of 10 in one million (NEBS 2013a, Section 4.3.2). The construction risk was the sum of the risks of the "Cancer Risk for Resident Child up to 2 Years Old" and "Cancer Risk for Resident Child 2 to 16 Years Old". Cancer risk for children was calculated in order to ensure that the analysis is conservative. The Daily Breathing Rate for children (581 liters per kilogram [L/kg] of body weight) is higher than that for adults (95^{th} percentile of 302 L/kg of body weight). As this is a short-term (up to 4 years) construction project, a child with a higher breathing rate would inhale a greater amount of diesel particulate matter (DPM) than an adult. Therefore, the results of the calculations used in the health risk assessment are a conservative estimate of cancer risk. The cancer risk for adults would be lower than the cancer risk for children (NEBC2013e).

Staff Analysis

Staff also calculated the risk of diesel exhaust from construction activities by assuming an exposure for a 9-year period, which is recommended by OEHHA for short-term exposure (OEHHA, 2003). The cancer risk calculated by staff is approximately 0.117[4] in one million for the fence line receptor and 0.002 in one million for the nearest residential receptor, which are still below the significance level of 10 in one million. As described above, construction of BSPP is anticipated to take place over a period of over four years (i.e. 48 months), which is shorter than the 9-year period assumed in the staff's calculations. Therefore, staff's analysis should be regarded as conservative because of the inherently conservative exposure-related assumptions made in the modeling analysis. Staff regards the related conditions of certification in the **Air Quality** section as adequate to ensure that cancer-related public health impacts of diesel exhaust emissions are mitigated during construction to a point where they are not considered significant.

The chronic hazard index for diesel exhaust during construction activities is 6.06×10^{-4} for the fence line receptor and 1.2×10^{-5} for the nearest residential receptor. Both of these indexes are lower than the significance level of 1.0. This result means that there would be no chronic noncancer impacts from construction activities. The potential levels of criteria pollutants from operation of construction-related equipment are discussed in staff's **Air Quality** section along with mitigation measures and related conditions of certification. The pollutants of most concern in this regard are particulate matter (PM), carbon monoxide (CO), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2).

PUBLIC HEALTH - Table 2
Construction Hazard/Risk from Diesel Particulate Matter

Receptor Location		Cancer Risk (in one million)	Significance Level (in one million)	Significant?
Fence Line	Project owner's Analysis [a]	0.61	10	No
	Staff's Analysis [b]	0.117		No
Nearest Residential	Project owner's Analysis [a]	0.012	10	No
	Staff's Analysis [b]	0.002		No
		Hazard Index (HI) [c]		
Fence Line		6.06×10^{-4}	1	No
Nearest Residential		1.2×10^{-5}		No

[a] Assumed for a 4-year exposure period (6 days per week, 52 weeks per year) and calculated based on the the Revised Technical Support Document for Exposure Assessment and Stochastic Analysis (OEHHA 2012). Source: NEBS 2013a, Section 4.3.2.
[b] Assumed for a 9-year exposure period with cancer unit risk of 3.86×10^{-5} per µg/m^3.
[c] Using Chronic Noncancer REL of 5 µg/m^3.

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[4] The construction risk calculated by the project owner was for children under 16 years old by using more conservative assumptions, such as breathing rates. Staff's analysis is based on the extrapolation of DPM's cancer unit risk factor of 3×10^{-4} (µg/m^3)$^{-1}$ from 70-year exposure period to 9-year exposure period.

Mitigation measures are proposed by both the project owner and Air Quality staff to reduce the maximum calculated PM10 and PM2.5 concentrations. These include the use of extensive fugitive dust control measures. In order to mitigate potential impacts from construction-related particulate emissions during the operation of diesel-powered construction equipment, staff notes that the use of ultra-low sulfur diesel fuel, an oxidation catalyst and soot filters on diesel equipment is included when possible. 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 85-92%. Such filters would reduce diesel combustion emissions during construction and further reduce the impacts associated with diesel exhaust. (See the **Air Quality** section of this SA for staff's proposal to control particulate matter.)

Construction could disturb a certain percentage of approximately 4,070 acres (BEBS 2013a, Section 4.2.1) of top soil that could harbor the *Coccidioides* spores possibly exposing humans to the risk of Valley Fever. On-site workers could be exposed from inhaling these fungal spores from wind-blown dust generated from soil excavation construction activities.

To minimize the risk of getting Valley Fever, the Center for Disease Control and Prevention (CDC) recommends the following measures for people such as onsite workers who are at risk of exposure to Valley Fever:

- wear an N95 mask if a person must be in or near a dusty environment, such as a construction zone;
- avoid activities that involve close contact to dust including yard work, gardening, and digging;
- use air quality improvement measures indoors such as HEPA filters;
- take prophylactic anti-fungal medication if deemed necessary by a person's healthcare provider; and
- clean skin injuries well with soap and water, especially if they have been exposed to soil or dust.

The California Department of Public Health (CDPH) also recommends that, "those exposed to dust during their jobs or outside activities in these areas should consider respiratory protection, such as a mask, during such activities." (CDPH, 2010)

The recommendations from CDC and CDPH are all preventive actions, but do not guarantee protection from exposure to Valley Fever. Based on CDC and CDPH's recommendations, staff recommends that project workers in the vicinity of such dust generation areas wet the soil before any excavation activities, wear protective masks and stay indoors during dust storms and close all doors to avoid dust inhalation. Staff also recommends people who live in endemic regions should try to avoid smoky and dusty environments. Staff considers the project owner's dust suppression plans adequate to minimize the risk of the public getting Valley Fever in areas where

Coccidioides spores are found. Please refer to staff's **Worker Safety and Fire Protection** section for more information regarding the exposure of the project's workers to Valley Fever.

As for the concerns of Valley Fever affecting the general population, in the **Air Quality** section of this SA staff recommends some mitigation measures, including **AQ-SC3 (Construction Fugitive Dust Control)** and **AQ-SC4 (Dust Plume Response Requirement)** for the purposes of preventing all fugitive dust plumes from leaving the project boundary. As long as the dust plumes are kept within the project boundary, there won't be any significant concern for Valley Fever adversely affecting the general population and public health.

OPERATION IMPACTS AND MITIGATION

NextEra Blythe Solar has not selected the specific PV modules nor has it decided on whether a tracker system, fixed tilt system**,** or combination of the two systems would be installed. Therefore, the staff's health risk assessment associated with the proposed BSPP assumes a worst-case in terms of the technology employed.

The elimination of the solar thermal technology dramatically reduces the operational and maintenance emissions associated with the proposed BSPP due to the following (NEBS 2013a, Section 4.2.1):

- Heat transfer fluid (HTF) will no longer be used, so the extensive piping throughout the solar field and the ullage systems will not be installed;
- The auxiliary boilers which burn natural gas and are used for freeze protection of the HTF and cold startup of the steam generators will no longer be needed;
- Emergency generators and fire water pump engines which burn diesel fuel are no longer planned in the power block area; and
- PV panels require much less frequent washing (e.g., at most quarterly) rather than the intensive weekly mirror washing program.

The emissions sources at the approved BSPP included four auxiliary boilers, four two-cell cooling towers, four diesel-fueled emergency generators, four diesel-fueled emergency fire pumps, four HTF expansion/ullage systems, and maintenance vehicles (mirror washing, weed abatement, soil stabilizer applicators, and water trucks). However, since the solar trough system would be replaced by PV, the auxiliary boilers, cooling towers, emergency generator and fire pump engines would no longer be needed. Therefore, using PV would not cause combustion-related toxic air emissions, and most of the TACs emitted from the approved BSPP would no longer be an issue except for DPM. Moreover, due to the infrequent washings of PV panels, DPM emissions from the use of mobile sources (i.e. vehicle systems of mirror washing equipment and site support vehicles) would be substantially less compared to the approved BSPP.

Both cancer and noncancer risk from the approved BSPP were calculated to be below the significance levels. Staff also concluded the approved BSPP would not have the potential to cause significant adverse public health impacts nor violate standards for public protection. Since the TACs emitted from the proposed BSPP would be much less than the ones emitted from the approved BSPP, the risks from the proposed BSPP are also expected to be less than those of the approved BSPP. Therefore, staff does not expect any significant adverse cancer, or short - or long-term noncancer health effects from the proposed BSPP air toxic emissions.

Some high-performance solar PV cells are known to contain small amounts of cadmium, selenium, and arsenic, and these substances could be emitted if any solar cells were broken. However, even with the possibility of PV panel cell breakage, staff does not consider any such emission hazards to be significant from a public health perspective and no conditions of certification would be required. Please refer to **Waste Management** section for the delivery, storage, handling, and disposal of PV-related wastes.

Four small wet cooling towers were proposed in the approved BSPP for ancillary equipment. The condition of certification **PUBLIC HEALTH-1** was proposed to require the cooling towers to implement aggressive water treatment and biocide application programs. Since the cooling towers proposed in approved BSPP would no longer be needed; staff recommends condition of certification **PUBLIC HEALTH-1** to be eliminated.

PROJECT CLOSURE AND DECOMMISSIONING

Closure of the proposed BSPP (temporary or permanent) would follow a closure plan prepared by the project owner and designed to minimize public health and environmental impacts. Staff expects that impacts to public health from the closure and decommissioning process of the proposed BSPP would represent a fraction of the impacts associated with the construction or operation of either the proposed or approved BSPP. 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 proposed BSPP would be insignificant. However, appropriate waste management practice must be followed to avoid contamination from the trace amounts of cadmium, selenium, and arsenic noted above. Please refer to **Waste Management** section for more information.

CEQA LEVEL OF SIGNIFICANCE

Staff’s analysis of public health impacts from the proposed BSPP has determined that impacts would be below the CEQA level of significance.

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 of Regulations, Title 14, section 15130).

The geographic scope of analysis for cumulative effects to public health is a 6-mile buffer zone around the project site. This is the same six-mile buffer zone for localized significant cumulative air quality impacts described and evaluated in the **Air Quality** section. Cumulative impacts of the proposed project and other projects within a 6-mile buffer zone were not quantitatively evaluated (NEBS 2013a). Staff considered the potential impacts due to construction and operation of the proposed BSPP with new projects or new “reasonably foreseeable probable future projects” in the area since the original project was approved. According to **EXECUTIVE SUMMARY - Figure 1** (Blythe Solar Power Project - Cumulative Impacts), the foreseeable projects which might have public health impacts fall within the 6-mile buffer zone of proposed BSPP include the Blythe Airport Solar I Project, the Blythe Energy Project II, and the McCoy Soleil Project.

The Blythe Airport Solar I Project is located ~2.78 miles from the proposed BSPP site, the Blythe Energy Project II is located ~5.37 miles from the proposed BSPP site, and the McCoy Soleil Project is located ~3.02 miles from the propose BSPP site. The maximum cancer risk and non-cancer hazard index (both acute and chronic) for operations emissions from the proposed BSPP estimated independently by the project owner and staff are all below the level of significance. While air quality cumulative impacts could occur with sources within a 6-mile distance, cumulative public health impacts are usually not significant unless the emitting sources are extremely close to each other, with a few blocks, not miles. Staff therefore concludes that the proposed BSPP, even when combined with these projects, would not contribute to cumulative impacts in the area of public health.

LORS COMPLIANCE

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 ARB. 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—would 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 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 proposed BSPP would be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **PUBLIC HEALTH**.

NOTEWORTHY PUBLIC BENEFITS

It is noteworthy that a solar electric generating facility such as the proposed BSPP 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 contribution to the overall background health risk that would otherwise occur with these non-renewable energy sources. At the same time, the proposed BSPP would provide much needed electrical power to California residences and businesses, and would contribute to electricity supply. 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.

Moreover, changing from solar trough collection system to PV technology would be more suitable for endemic areas of Valley Fever. This is because the PV technology does not require an entirely flat surface and would decrease the disturbance of the top soil.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments have been received on the topic of public health.

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the proposed BSPP 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 BSPP 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 proposed BSPP project would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

The cooling towers proposed in approved BSPP would no longer be needed; therefore, staff recommends the condition of certification **Public Health-1** proposed for the approved BSPP would be eliminated.

~~**Public Health-1** The Project owner shall develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in all four wet cooling towers 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 six months. After two 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.~~

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SOCIOECONOMICS

Testimony of Steven Kerr

SUMMARY OF CONCLUSIONS

California Energy Commission (Energy Commission) staff has reviewed the Revised Petition to Amend the Commission Decision for the Blythe Solar Power Project (BSPP) in accordance with the requirements of the California Environmental Quality Act (CEQA). The petition proposes to eliminate the use of solar parabolic trough technology approved under the Commission Decision and replace it with photovoltaic (PV) solar technology. Staff's analysis considers the changes between the approved project and the modified project.

Staff concludes that the construction and operation of the modified project would not cause a significant adverse direct or indirect impact or contribute to a cumulative socioeconomic impact on the area's housing, schools, law enforcement services, or parks. The project would not induce a substantial population growth or displacement of population, or induce substantial increases in demand for housing, parks, or law enforcement services.

Staff concludes the population in the six-mile project buffer constitutes an environmental justice population as defined by *Environmental Justice: Guidance under the National Environmental Policy Act*. The total minority population within the six-mile project buffer is 59 percent, as shown in **Socioeconomics Figure 1**. As the demographic screening area as a whole exceeds 50 percent, staff in the 13 technical areas identified in the Executive Summary has considered environmental justice in their environmental impact analysis.

INTRODUCTION

Staff's socioeconomics impact analysis evaluates project-caused changes on existing population, housing, employment patterns, and community services. Staff analyzes the potential impacts of the construction and operation of the modified project on local communities, community resources, and law enforcement services, and also provides a discussion of the estimated beneficial economic impacts of the construction and operation of the proposed project.

METHODOLOGY AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

CEQA requires a list of criteria 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" (Cal. Code Regs., tit., 14 § 15382).

Thresholds serve as the benchmark for determining if a project will result in a significant adverse impact when evaluated against existing conditions (e.g., "baseline" conditions). CEQA Guideline section 15064(e) specifies that: "[e]conomic and social changes resulting from the project shall not be treated as significant effects on the environment." Section 15064(e) states that when "a physical change is caused by economic or social effects of a project, the physical change may be regarded as a significant effect in the same manner as any other physical change resulting from the project. Alternatively, economic and social effects of a physical change may be used to determine that the physical change is a significant effect on the environment. If the physical change causes adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change is significant." Staff has used Appendix G of the CEQA Guidelines for this analysis, which specifies that a project may have a significant effect on population, housing, law enforcement services, schools, and parks 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 police protection, schools, and parks and recreation.

Staff's assessment of impacts on population, housing, police protection, schools, and parks and recreation is based on professional judgments, input from local and state agencies, and the industry-accepted, two-hour commute range for construction workers and one-hour commute range for operational workers. Typically, long-term employment of people from regions outside the study area could potentially result in significant adverse socioeconomic impacts.

Criteria for subject areas such as utilities, fire protection, emergency medical services, water supply, and wastewater disposal are analyzed in the **Reliability**, **Worker Safety and Fire Protection**, and **Soils and Water Resources** sections of this document.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Socioeconomics Table 1 contains socioeconomics laws, ordinances, regulations, and standards (LORS) applicable to projects proposed on non-federal land. The modified project is proposed on Bureau of Land Management (BLM) land, as was the approved project, therefore the provisions of Education Code section 17620 would not apply, and no school impact fees would be collected for the modified project, as was the case for the approved project (CEC 2010g). No other LORS related to socioeconomics would apply to the modified project.

SOCIOECONOMICS 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.

PROPOSED MODIFIED PROJECT

The changes from the approved project to the modified project relevant to socioeconomics involve the construction and operations workforce numbers (including the peak and average number of workers), duration of construction, and estimated fiscal benefits. The construction schedule for the modified project would be 48 months rather than the approved project's 69-month schedule. The construction workforce would be reduced from an average of approximately 604 construction workers, with a peak month workforce of 1,001, to an average of 341 construction workers, with a peak month workforce of 499. The operations workforce would decrease from about 221 permanent, full-time employees to hiring 15 permanent, full time employees. Temporary personnel would be employed, as needed, during seasonal periods when panel washing is required. The changes to the fiscal benefits are presented in **Socioeconomics Table 14.** The modified project is in the same location as the approved project, but reduced in acreage. Therefore, the regional and local study areas are not changed from the approved project.

SETTING

Staff defines the study area related to the project's operational impacts on population, housing, and parks as the local study area, and the project's construction impacts on population, housing, and parks as the regional study area – both study areas are defined below. The study area for law enforcement is the local jurisdictional boundaries for the Riverside Sheriff's Department. The study area for impacts to schools is the Palo Verde and Desert Center School districts. The study area for indirect and induced economic impacts is defined as Riverside County. The study area for environmental justice impacts is within a six-mile buffer of the project site.

Regional Study Area

For the purposes of assessing project impacts during construction, staff defines the regional study area as within a two-hour commute of the project. The regional study area is roughly defined by the distance construction workers are typically willing to commute daily to a project site, and includes Riverside County, California, San Bernardino County, California, and La Paz County, Arizona, and Maricopa County, Arizona.

The modified project includes the construction and operation of a solar generating facility located in the Southern California inland desert, approximately 8 miles west of the city of Blythe, in eastern Riverside County, California.

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 Table 2**. The regional study contains a high number of housing units, with San Bernardino and Riverside counties contributing the largest number of vacant units in the BSPP study area. Among all counties within the study area, La Paz County has the highest vacancy rate (43 percent).

Socioeconomics Table 2
Population and Housing Profile of the Regional Study Area

Population							
Area	**2000[1]**	**2010[2]**	**2020[4] Projected**	**2030[4] Projected**	**2040[4] Projected**	**2050[4] Projected**	**2060[4] Projected**
Riverside County, California	1,545,387	2,189,641	2,593,211	3,046,064	3,462,256	3,828,798	4,216,816
	1,545,387	2,189,641	2,592,000[5]	3,324,000[5]	—	—	—
San Bernardino County, California	1,709,434	2,035,210	2,273,017	2,626,945	2,988,648	3,248,440	3,433,047
La Paz County, Arizona	19,579	22,632	21,988[6]	23,615[6]	25,351[6]	27,710[6]	—
Maricopa County, Arizona	3,072,149	3,817,117	4,632,632	5,693,204	6,767,353	7,846,208	—

Housing				
Area	**2010 Total Housing Units**	**2010 Occupied Housing Units**	**2010 Vacant Housing Units**	**2010 Vacancy Rate**
Riverside County, California	800,707	686,260	114,447	14%
San Bernardino County, California	699,637	611,618	88,019	13%
La Paz County, Arizona	16,049	9,198	6,851	43%
Maricopa County, Arizona	1,639,279	1,411,583	227,696	14%

Notes: — Data not available
Source: [1]US Census 2000; [2]US Census 2010a; [3]US Census 2010b; [4]CA DOF 2013; [5]SCAG 2012; [6]AZ Dept. of Admin 2012.

Local Study Area

Staff defines the local study area during project operation as within a one-hour commute of the project. An analysis at a local level presents a challenge because the proposed BSPP is in a sparsely populated area, with the largest urban center being the city of Riverside, located approximately 100 miles west of the site. A reasonable study area for localized socioeconomic impacts would include the two nearest communities: the city of Blythe, CA (approximately 8 miles east of the BSPP site); the city of Ehrenburg, AZ (approximately 12 miles east of the BSPP site); and the city of Quartzsite, AZ (approximately 25 miles east of the BSPP site). The most recently published population and housing data for these communities are presented below in **Socioeconomics Table 3.**

Socioeconomics Table 3
Population and Housing Profile of the Local Study Area

Population						
Area	**2000**		**2010**		**2020**	**2030**
Blythe, California	12,155		20,817		22,700	24,300
Desert Center, California	—		204		—	—
Ehrenburg, Arizona	1,357		1,470		—	—
Quartzsite, Arizona	3,354		3,677		—	—
Housing						
Area	**Total Housing Units**	**Occupied Housing Units**	**Vacant Housing Units**	**Vacancy Rate**	**For Sale**	**For Rent**
Blythe, California	5,473	4,513	960	18%	26%	10%
Desert Center, California	140	85	55	39%	24%	11%
Ehrenburg, Arizona	948	645	303	32%	16%	7%
Quartzsite, Arizona	3,378	2,027	1,351	40%	6%	8%

Notes: — Data not available
Sources: US Census 2000; US Census 2010a; US Census 2010b; CA DOF 2013; SCAG 2012, AZ Dept. of Admin 2012.

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 the three communities being rural suburban locations closely tied to the Interstate 10 travel route between the cities of Los Angeles, CA and Phoenix, AZ.

Using the 2010 US Census and US Census Bureau's American Community Survey in Staff Assessments

The detailed social, economic, and housing information previously collected only in the decennial census was not collected for the 2010 Census (US Census 2011a). This information is now collected through the U.S. Census Bureau's American Community Survey (ACS). Decennial census data are from a 100 percent count collected once every ten years and represent information from a single reference point (April 1). The main function of the decennial census is to provide *counts* of people for the purpose of congressional apportionment and legislative redistricting. ACS estimates are collected from a sample of the population based on information compiled continually and aggregated into one, three, and five-year estimates ("period estimates") released every year. The primary purpose of the ACS is to measure the changing social and economic characteristics of the U.S. population. As a result, the ACS does not provide official counts of the population in between censuses. Instead, the Census Bureau's Population Estimates Program will continue to be the official source for annual population totals, by age, race, Hispanic origin, and sex.

ACS collects data at every geographic level from the largest level (nation) to the smallest level available (block group (BG)).[1] Census Bureau staff recommends the use of data from units no smaller than the census tract level.[2,3] Data from the five-year estimates are used for staff's analysis as it provides the greatest detail at the smallest geographic level. Because ACS estimates come from a sample population, a certain level of variability is associated with these estimates. This variability is expressed as a margin of error (MOE). The MOE is used to calculate the coefficient of variation (CV). CVs are a standardized indicator of the reliability of an estimate. While not a set rule, the U.S. Census Bureau considers the use of estimates with a CV of more than 15 percent a cause for caution when interpreting patterns in the data (US Census 2009). In situations where CVs for estimates are high, the reliability of an estimate improves by using estimates for a larger geographic area (e.g., city or community versus census tract), or by aggregating estimates of adjacent geographic areas, such as cities.

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[1] Census Block Group - A statistical subdivision of a census tract. A BG consists of all tabulation blocks whose numbers begin with the same digit in a census tract; for example, for Census 2000, BG 3 within a census tract includes all blocks numbered between 3000 and 3999. The block group is the lowest-level geographic entity for which the Census Bureau tabulates sample data from the decennial census. http://www.census.gov/dmd/www/glossary.html.

[2] Census Tract - A small, relatively permanent statistical subdivision of a county or statistically equivalent entity, delineated for data presentation purposes by a local group of census data users or the geographic staff of a regional census center in accordance with Census Bureau guidelines. Census tracts are designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions at the time they are established. Census tracts generally contain between 1,000 and 8,000 people, with an optimum size of 4,000 people. Census tract boundaries are delineated with the intention of being stable over many decades, so they generally follow relatively permanent visible features. http://www.census.gov/dmd/www/glossary.html.

[3] Using the American Community Survey (ACS) and The New American Factfinder (AFF). Census Workshop presented by Barbara Ferry, U.S. Census Partnership Data Services Specialist, hosted by Sacramento Area Council of Governments, May 11–12, 2011.

Project-Specific Demographic Screening

Staff's demographic screening is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy* Act (CEQ 1997) and *Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses* (US EPA 1998). The intention is to identify potentially sensitive populations, which could be disproportionately impacted by the proposed action. Due to the changes in the data collection methods used by the U.S. Census Bureau, the screening process relies on 2010 U.S. Census data to determine the number of minority populations and data from the 2007–2011 ACS to evaluate the presence of individuals and households living below the federal poverty level.

Staff's demographic screening is designed to identify the presence of minority and below-poverty-level populations within a six-mile area of the proposed project site. The six-mile buffer is based on air quality modeling, which shows that project-related impacts from pollutants decrease to less than significant within six miles of the emission site. Staff uses the six-mile buffer to determine the area of potential project impacts and to obtain data to gain a better understanding of the demographic makeup of the communities potentially impacted by the project. Once Socioeconomics staff identifies the presence of an environmental justice population, staff from the thirteen affected technical areas evaluates the project for potential disproportionate impacts on the environmental justice population.[4] When staff's screening analysis does not identify the population in the six-mile buffer as an environmental justice population, as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act*, no further scrutiny of this population is required for purposes of an environmental justice analysis.

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. An environmental justice population is identified when the minority population of the potentially affected area is greater than 50 percent or meaningfully greater than the minority population in the general population or other appropriate unit of geographical analysis.

For the BSPP, the total population within a six-mile buffer of the proposed site is 1,697 persons based on Year 2010 U.S. Census block group data, and the total minority population is 996 persons or 59 percent of the total population (see **Socioeconomics Figure 1**). As the demographic screening area as a whole exceeds 50 percent, as shown in **Figure 1**, staff in the 13 technical areas identified in the Executive Summary has considered environmental justice in their environmental impact analysis.

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[4] The thirteen technical staff/areas are Air Quality, Hazardous Materials Management, Land Use, Noise and Vibration, Public Health, Socioeconomics, Soils and Surface Water Resources, Water Supply, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, Cultural Resources, and Waste Management.

Socioeconomics Table 4
Minority Population in the Project Area

	Six-Mile Buffer Around Project Site	Blythe City, CA	Riverside County	Ehrenberg CDP, AZ	Quartzsite Town, AZ
Total	1,697	20,817	2,189,641	1,470	3,677
Not Hispanic or Latino: White alone	701	5,894	869,068	1,118	3,403
Minority	996	14,923	1,320,573	352	274
Percent Minority	59	72	60	24	7

Notes: CDP – Census Designated Place.
Source: US Census Bureau 2010c.

Below-Poverty-Level Populations

The poverty status of households and individuals is determined based on a set of income thresholds, set by the U.S. Census Bureau, that vary by family size and composition. If the total income of the family is less than the family's threshold, that family and every individual in it is considered in poverty. The official poverty thresholds do not vary by geography (e.g., state, county, etc.), but are updated annually to allow for changes in the cost of living. The population for whom poverty status is determined does not include institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

Staff identified the below-poverty-level population in the project area using county level data from the 2007-2011 ACS Five-Year Estimates from the U.S. Census (US Census 2011b).[5] Approximately 14 percent, or 13,020 people, in Blythe City live below the federal poverty threshold. **Socioeconomics Table 5** presents poverty data for Blythe City, plus Blythe CCD, Riverside County, and California for reference purposes. Poverty data for the Ehrenberg CDP and Quartzsite Town in Arizona were not included because the CV values were greater than 20, indicating that the data were unreliable and may not accurately reflect local characteristics.

SOCIOECONOMICS Table 5
Poverty Data within the Local Study Area

Area	Total			Income in the past 12 months below poverty level			Percent below poverty level		
	Estimate*	MOE	CV	Estimate	MOE	CV	Estimate	MOE	CV
Blythe City, CA	13,020	±625	1.52	1,961	±463	14.35	15.10	±3.60	
Blythe CCD, CA	15,234	±789	3.15	2,548	±506	12.07	16.70	±3.30	
Riverside County	2,119,466	±1,760	0.05	301,763	±8,482	1.71	14.20	±0.40	1.71
California	36,211,794	±3,530	0.01	5,211,481	±39,013	0.46	14.40	±0.1	0.42

Notes:* Population for whom poverty status is determined. CDP – Census Designated Place, CCD – Census County Division.
Source: US Census 2011a.

[5] Staff determined that the data at the county level are the lowest level available that retain reasonable accuracy. The data represent a period estimate, meaning the numbers represent an area's characteristics for the specified time period.

Additional Environmental Justice Population Considerations

Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses (US EPA 1998) also encourages outreach to community-based organizations and tribal governments early in the screening process to identify the presence of distinct minority communities residing within, or in close proximity to, the proposed project site. It also encourages identification of minority groups that utilize or hold sacred certain natural and cultural resources that may be affected by the proposed action.

For information regarding the Energy Commission's outreach program and consultations with local Native American communities, see the **Executive Summary, Introduction,** and **Cultural Resources** sections of this document. Cultural Resources staff has identified tribal entities that use the project area. Therefore, this environmental justice population, as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act,* would trigger further scrutiny by Cultural Resources staff for purposes of an environmental justice analysis. Refer to the **Cultural Resources** section for more information.

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 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 BSPP project to be the Riverside/San Bernardino/Ontario Metropolitan Statistical Area (MSA)[6], which includes both Riverside and San Bernardino counties. While the city of Ehrenberg, within La Paz County, Arizona, is located within the proposed BSPP regional study area and could contribute to the local workforce, detailed labor skill data are unavailable for this limited portion of the regional and local study area. As shown above in **Socioeconomics 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. Staff has focused this analysis on the cities and communities along the Interstate-10 corridor, as this route provides the most reasonable access to the BSPP site. Access to the site from other parts of Riverside, San Bernardino, and La Paz Counties is not as convenient.

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[6] 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 project owner expects that construction of the modified project would require a smaller workforce and a shorter construction period than the approved project. Construction of the modified project would last for 48 months, while construction of the approved project was 69 months. The construction workforce would decrease from an average of approximately 604 daily construction workers, with a peak month workforce of 1,001, to an average of approximately 341 workers, with a peak month workforce of 499 workers (NEBS2013k). This peak employment number is used to analyze worst-case construction population and employment impacts. **Socioeconomics Table 6** shows Year 2010–2020 occupational employment projections for the Riverside/San Bernardino/Ontario MSA by construction labor skill. The number of construction workers by trade for the modified project peak month (month 20) is presented in **Socioeconomics Table 6** and compared with the construction workforce needed for the approved project.

Socioeconomics Table 6
Total Labor by Skill in Riverside/San Bernardino/Ontario MSA and Construction Worker by Craft, Peak Month

Trade	Total Workers for Construction by Craft (peak month)		Riverside/ San Bernardino/ Ontario MSA	
	Approved Project	Modified Project	2010	2020
Administrator[1]	5	0	14,010	16,310
Boilermaker[4]	9	0	52,650	57,040
Carpenter	77	8	10,140	10,450
Cement Finisher	80	0	2,420	2,570
Construction Manager[3]	2	0	5,000	5,490
Electrician	81	34	4,000	4,520
Engineer	7	8	7,270	8,120
Fencer	0	5	700	840
Glazier[4]	0	4	52,650	57,040
Insulation Installer[4]	0	4	52,650	57,040
Ironworker[5]	42	12	700	670
Laborer[6]	229	303	11,870	13,380
Landscaper	0	5	16,440	19,840
Mason	0	4	850	850
Millwright	18	22	140	140
Oiler[4]	4	0	52,650	57,040
Operator[7]	94	20	2,510	3,030
Painter	0	4	4,320	4,570
Pile Driver	0	10	2,510	3,030
Pipe Fitter[2]	290	8	3,160	3,570
Plumber[2]	0	4	3,160	3,570
Project Manager[3]	2	0	5,000	5,490
PM Assistant[3]	2	0	5,000	5,490
Sheet Metal Worker	0	6	1,440	1,580
Support[8]	2	0	13,430	15,360
Support Assistant[9]	2	0	38,240	43,010
Surveyor	16	0	440	520
Timekeeper	2	0	1,840	2,120
Tradesman[6]	8	0	11,870	13,380
Truck Driver	28	24	22,530	28,960
Welder	1	14	2,650	3,090

Notes:
1 - The “First-Line Supervisors of Office and Administrative Support Workers” category was used.
2 - The “Plumbers, Pipefitters, and Steamfitters” category was used.
3 - The “Construction Managers” category was used.
4 - The “Construction Trades Workers” category was used.
5 - The “Structural Iron and Steel Workers” categories were used.
6 - The “Construction Laborers” category was used.
7 - The “Operating Engineers and Other Construction Equipment Operators” category was used.
8 - The “Bookkeeping, Accounting, and Auditing Clerks” category was used.
9 - The “Other Office and Administrative Support Workers” category was used.
Sources: Solar Millennium2009a, Tables 5.11-8,5.11-11, and 5.11-17; EDD 2012; NEBS2013a; NEBS2013k.

As shown in **Socioeconomics Table 6**, there is more than adequate local availability of construction workforce within the Riverside/San Bernardino/Ontario MSA for the approved project and given the decrease in total number of workers for the modified project, there would be continue to be adequate local availability of workforce for the BSPP.

For the approved BSPP, staff assumed that up to 15 percent of construction workers would seek local lodging during the workweek, and up to 85 percent would commute daily. Staff is using the same assumptions for the modified. Therefore, for the modified project peak construction, approximately 75 workers may temporarily relocate closer to the project site, which represents a decrease of 76 workers from the approved project.

Hotel/Motel. **Socioeconomics Table 7** identifies over 12,900 motel/hotel rooms within a two-hour commute of the project site in selected cities in Riverside County and the nearby communities of Ehrenberg and Quartzite in Arizona.

Socioeconomics Table 7
Hotel/Motel Supply Within the BSPP Regional and Local Study Areas

Geographic Area	Hotels/Motels	Total Number of Rooms
Bermuda Dunes, California	1	Data not available
Blythe, California	21	1,032
Cathedral City, California	3	234
Coachella, California	0	0
Desert Center, California	0	0
Indian Wells, California	5	1,508
Indio, California	13	808
Mecca, California	0	0
Mesa Verde, California	0	0
Palm Desert, California	14	2,300
Palm Springs, California	55	5,232
Palo Verde, California	0	0
Rancho Mirage, California	6	1,598
Ripley, California	0	0
Thermal, California	0	0
Thousand Palms, California	1	116
Ehrenberg, Arizona	1	84
Quartzsite Arizona	1	50
Totals	121	12,962

Sources: BS 2011a, adapted from Table 5.10-6, pg. 5.10-16.1

Housing Vacancy. As shown in **Socioeconomics Table 3**, the closest community to the BSPP site, the city of Blythe, had an 18 percent vacancy rate with 960 vacant housing units available in 2010. A five percent vacancy is largely accepted as a minimum benchmark for a sufficient amount of housing available for occupancy (Virginia Tech 2006). **Socioeconomics Table 8a** presents a more detailed look at housing supply within a two-hour commute of the BSPP and **Socioeconomics Table 8b** presents a more detailed look at the type of vacancy available. In 2010, a total of 40,733 vacancies, representing a 30 percent vacancy rate, were available in the cities and communities within the regional study area. The housing counts in the study area indicate a greater supply of available housing units than demand. In 2010, a total of 43,559 vacancies, representing a 28 percent vacancy rate, were available in the cities and communities within the regional study area. As presented in **Socioeconomics Table 8b**, the vacant housing supply shows a total of 6,585 of the vacancies were available for rent, 4,007 vacancies were available for sale, and 28,536 vacancies were for seasonal, recreational or occasional use. The housing counts in the study area indicate a greater supply of available housing units than demand.

Socioeconomics Table 8a
Housing Unit Supply Within the BSPP Regional and Local Study Areas

Geographic Area	Total	Occupied	Vacant	Percent Vacant
Bermuda Dunes, CDP, California	3,639	2,942	697	19
Blythe, California	5,473	4,513	960	18
Cathedral City, California	20,995	17,047	3,948	19
Coachella, California	9,903	8,998	905	9
Desert Center CDP, California	140	85	55	39
Indian Wells, California	5,137	2,745	2,392	46
Indio, California	28,971	23,378	5,593	19
Mecca, CDP, California	2,020	1,854	166	8
Mesa Verde CDP, California	360	312	48	13
Palm Desert, California	37,073	23,117	13,956	38
Palm Springs, California	34,794	2,274	12,048	35
Palo Verde CDP, California	211	84	127	60
Ripley, CDP, California	295	218	77	26
Thermal, CDP, California	761	684	77	10
Thousand Palms, CDP, California	3,705	2,849	856	23
Ehrenberg, CDP, Arizona	948	645	303	32
Quartzsite, Arizona	3,378	2,027	1,351	40
Total	157,803	93,772	43,559	28
Counties				
Riverside County, California	800,707	686,260	114,447	14
La Paz County, Arizona	16,049	9,198	6,851	43

*CDP – Census Designated Place
Source: US Census Bureau 2010b.

Socioeconomics Table 8b
Vacancy Status Within the BSPP Regional and Local Study Areas

Geographic Area	Vacant		For Rent	For Sale	Seasonal, Recreational, or Occasional Use		Other Vacant
	Number	Percent	Number	Number	Number	Percent	Number
Bermuda Dunes, CDP, California	697	19	298	80	250	35.9	69
Blythe, California	960	18	248	100	448	46.7	167
Cathedral City, California	3,948	19	786	472	2,138	54	552
Coachella, California	905	9	197	388	104	12	216
Desert Center CDP, California	55	39	13	6	23	41.8	13
Indian Wells, California	2,392	46	85	124	2,028	84.8	155
Indio, California	5,593	19	1,166	810	2,986	53.4	631
Mecca, CDP, California	166	8	100	9	17	10	40
Mesa Verde, CDP, California	48	13	33	5	5	10	5
Palm Desert, California	13,956	38	1,616	798	10,418	74.6	1,124
Palm Springs, California	12,048	35	1,744	974	8,151	67.7	1,179
Palo Verde CDP, California	127	60	10	7	91	71.7	19
Ripley, CDP, California	77	26	49	2	4	5	22
Thermal, CDP, California	77	10	30	2	6	8	39
Thousand Palms, CDP, California	856	23	85	102	565	66	104
Ehrenberg, CDP, Arizona	303	32	47	22	215	71	19
Quartzsite, Arizona	1,351	40	78	106	1,087	80.5	80
Total	43,559	28	6,585	4,007	28,536	66	4,434
Counties							
Riverside County, California	114,447	14	25,547	18,417	50,538	44.2	21,945
La Paz County, Arizona	6,851	43	586	370	5,318	77.6	577

*CDP – Census Designated Place; ** Other Vacant includes "rented, not occupied, sold, not occupied, migratory workers, and other vacant"
Source: US Census Bureau 2010b

Campground/RV Parks. **Socioeconomic Table 9** shows abundant RV park spaces in the Blythe, Ehrenberg, and Quartzite areas. However, RV parks in Blythe tend to be located along the Colorado River and receive higher levels of use during the summer, thereby possibly reducing availability for construction workers.

Socioeconomics Table 9
RV Parks Near the BSPP Site

Geographic Area	RV Spaces
Blythe, California	795
Ehrenberg, Arizona	94
Quartzite, Arizona	1,876

Sources: BS 2011a, adapted from Table 5.10-7, pg. 5.10-17; URS 2012a.

For the approved project, staff contacted a small sample of these RV parks and learned that while they have a large number of spaces, many are occupied by year-round residents or are 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).

Lodging Availability and BSPP Workforce

Staff recently contacted Mr. Bill Perez, Executive Secretary with the San Bernardino and Riverside counties Building and Construction Trades Council (local BCTC), to better understand the housing choices of construction workers employed at solar power plant projects in Riverside County (CEC 2013w). Mr. Perez stated that a good number of Craft Workers are local residents in Riverside and San Bernardino counties and carpool daily to project sites, generally three to four persons per vehicle. He also reported that construction workers for energy projects in Riverside County are staying in Indio and Blythe in California and Ehrenberg in Arizona. Mr. Perez noted that the construction workers for the current energy projects in construction in Riverside County have not found any problems in securing lodging.

According to Mr. Perez, the seasonal vacancy rates, especially in Blythe has not posed a problem for construction workers seeking lodging for the solar power plant projects. Mr. Perez explained that there are only two times when out-of-the-area visitors would seek local lodging: in January when Quartzsite holds a rock and gem show and during dove season in September. Lodging during these times is a little more difficult, but can be found. When construction workers secure lodging for extended construction periods they are not subject to the higher seasonal room rates. Construction workers often share rooms to reduce costs and as they rent rooms for long periods, they can often negotiate room rates.

Mr. Perez explained that construction workers typically seek lodging close to a freeway with easy on-off access, and convenience stores, gas stations, and dining options. Construction workers who commute to a project site typically do not look for amenities like movie theaters or retail shopping because they return to their primary residences on the weekend. Mr. Perez stated that construction workers employed would not seek lodging in Palm Springs, Palm Desert, La Quinta or Indian Wells because of the high cost of lodging. Mr. Perez explained that construction workers would not seek lodging around Thermal, Mecca or other communities near the Salton Sea because these areas are too far from Interstate 10.

Additionally, there is currently a significant construction workforce working approximately 15 miles from the BSPP site, constructing the Genesis Solar Energy Project (GSEP). The GSEP has an estimated peak month construction workforce of 1,085 workers who are expected to be finishing their work in 2014 (GSEP 2009a). The project owner anticipates that many of these same workers would be employed for the construction of the BSPP, which would significantly reduce the number of new workers coming into the area (NEBS2013j).

Conclusion. Based on available local study area data and discussions with Mr. Perez, staff concludes that any construction workers seeking RV and campground lodging could find limited availability during January and September. However, ample local housing (hotel/motel and housing units) would be available to any construction worker seeking to relocate during construction. Because of the availability of short-term housing in the local study area and the soon to be available workforce already residing or commuting to the area, staff concludes that construction of the modified project would not temporarily induce substantial growth or a concentration of population in the local study area.

Operation

The modified project is expected to require 15 operational employees, compared with the 221 permanent operational employees that were required for the approved project (NEBS2013a). **Socioeconomics Table 10** shows Year 2010-2020 occupational employment projections for the Riverside/San Bernardino/Ontario MSA by operational labor skill, and the estimated total number of operational workers needed for the modified project, along with the number needed for the approved project.

Socioeconomics Table 10
Total Labor by Skill in Riverside/San Bernardino/Ontario MSA and Required Operations Workers

Trade	Total Workers for Project Operation		Riverside/ San Bernardino/ Ontario MSA	
	Approved Project	Modified Project	2010	2020
Production Technicians[1]	—	14	1,770	1,910
High-Voltage Technician[2]	—	1	4,000	4,520
Total	*221*	*15*	*5,770*	*6,430*

1 - The “Plant and System Operators” category was used.
2 - The “Electricians Solar Photovoltaic” category was used.
Sources: Solar Millennium 2009a, Table 5.11-8; NEBS2013a; NEBS2013j.

Data for the Riverside/San Bernardino/Ontario MSA indicate that in the Year 2010, the "Plant and System Operators" and "Electricians Solar Photovoltaic" employment sectors contained 5,770 workers, with Year 2020 forecasts for these employment sectors estimated at 6,340 employees. The applicant for the approved project estimated that 75 percent of operational workers would come from within the regional study area workforce, resulting in a potential influx of approximately 55 workers in the communities in the local study areas (Solar Millennium 2009a). With the reduction of operational workers for the modified project, staff estimates 4 permanent workers could choose to live closer to the project site. Housing data show that the vacancy rates for the cities of Blythe, California, Ehrenberg, Arizona, and Quartzsite, Arizona, are 18, 32, and 40 percent, respectively. Even with seasonal variations in vacancy rates, 2010 Census data shows there was a total of 373 housing units available for rent and 228 housing units available for sale in Blythe, Ehrenberg, and Quartzsite combined. Given the possible addition of four permanent workers, ample local housing is available should these operational employees choose to relocate to the local study area. Additionally, as shown in **Socioeconomics Table 2**, the regional study area provides a high number of available housing opportunities. The addition of up to four workers for the BSPP operations to either the local or regional study area would not induce substantial growth or concentration of population in excess of available housing or forecasted growth.

Staff concludes that the modified project would not inducesubstantial population growth and impacts would be less than significant, under CEQA, which is consistent with the conclusion for the approved BSPP.

Displace Existing Housing and Substantial Numbers of People

The proposed BSPP site is vacant undeveloped desert land with desert scrub located throughout, with no housing structures existing on the property (Solar Millennium2009a, pp. 5.7-14 and 5.7-15). As such, no housing or persons would be displaced by the BSPP. Furthermore, staff has determined that no housing would be displaced from required transmission line and other infrastructure linear connections right-of-way (ROW) associated with the BSPP.

Staff concludes that the required construction workforce for the modified project would be found in the regional study area, consistent with the approved project. An estimated 15 percent of workers could seek local lodging during the workweek. There appears to be sufficient lodging in the local and regional study area to house the 75 (at peak month) BSPP construction workers without triggering the need for new housing.

Vacancy rates within the local study area offer the four BSPP operations employees wishing to relocate sufficient 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 BSPP 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 can increase the demand for a particular service, leading to the need for expanded or new facilities. Public service providers serving the BSPP site are located within Riverside County. Therefore, the study area for the public services analysis is limited to Riverside County.

As discussed under the subject headings below, the BSPP would not cause significant impacts to service ratios, response times, or other performance objectives relating to law enforcement, schools, or parks.

Police Protection

The BSPP site would be served by the Riverside County Sheriff’s Department Colorado River Station at 260 North Spring Street in Blythe, California. The Colorado River Station provides service to the unincorporated area from Red Cloud Road on the west, to the Arizona state line on the east, and county line to county line on the north and south (Solar Millennium2009a, p. 5.11-19). Communities included in this service area are Desert Center, Eagle Mountain, East Blythe, Hayfield, Midland, Nicholls Warm Springs, Ripley, and the Colorado River.

Staff received comments on the modified project in response to staff’s outreach to the Riverside County Sheriff’s Department at the Colorado River Station and incorporated their comments in this document (RCSD 2013a). The sheriff’s department has 27 sworn officers and 10 non-sworn officers with 2 to 3 officers on duty per shift. The Colorado River Station is approximately 12 miles from the BSPP site.

The response time to the BSPP site is estimated at 10 to 30 minutes depending on the severity of the call. The sheriff’s department expects that the project would not trigger a need for additional law enforcement services for on-site crimes against persons, theft of materials, and vandalism during construction or operation. Additionally, the sheriff’s department does not expect that the project-related traffic would affect circulation and access on roads near the project site to the extent that emergency response times might be affected.

The sheriff’s department advised that total perimeter fencing should be provided, including illumination of access points. In addition, gates at the project site should not be obstructed. The sheriff’s department also advised that No Trespassing signage and the location address should be posted and visible, and requested that a “No Trespassing” letter be on file at the sheriff’s station during construction and operation of the project. This letter would state the following: no one, other than employees, are permitted on the property; the owner or designee is requesting enforcement of trespass laws by the Riverside County Sheriff’s Department; the owner or designee will testify in court; the property has been posted with “No Trespassing” signs; and contact information of the owner/designee. Staff is proposing Condition of Certification **SOCIO-1** to address this request.

Construction. The modified project would have fencing around the site and access would be controlled via gates located at the entrances to the facility consistent with the approved project. The two main site security access gates would be monitored through a security camera, swipe card, or other mechanism that would control and monitor access. There would be a guard shack at the main facility gate during construction. Access through the main gates would be controlled during construction and operation of the BSPP to prevent unauthorized access to the solar plant site. All facility personnel, contractors, and visitors would be logged in and out of the facility. A secondary access gate, similar in construction to the main gate, would be used for emergency purposes only. A fire department Knox Box or other access device and emergency contact placard would be provided at the main gate and secondary access gate to provide emergency access. (NEBS2013a)

During the peak construction month, up to 75 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. Also, the service standard for the Riverside County Sheriff’s Department is one officer per 1,000 population. Even if all 75 workers were to temporarily relocate within this service area, they would not trigger a need for additional sheriff staffing or services. While the BSPP would increase the number of individuals within the local study area during construction, the increase would not be substantial and would not necessitate new or expanded law enforcement facilities or staff levels within the BSPP regional or local study areas.

Additionally, the **Hazardous Materials Management** section of this document proposes Conditions of Certification **HAZ-4** and **HAZ-5,** which require the preparation of a Construction Site Security Plan and an Operation Security Plan to ensure site security. The plans also include a protocol for contacting law enforcement and the Energy Commission Compliance Project Manager (CPM) in the event of suspicious activity or emergency. Site security would minimize the potential need for the Riverside County Sheriff’s Department assistance.

Operation. Once operational, the BSPP site would include security fencing and controlled access gates, which would minimize the potential need for the Riverside County Sheriff’s Department assistance. As discussed above, the operational workforce for the BSPP is expected to be hired from within the available regional workforce. It is possible that up to four operational employees could choose to relocate to the BSPP local area from more distant regional study area locations. As it is likely a number of these employees already reside within Riverside County, relocation to the local area would not result in an increase over the total population policed by the Riverside County Sheriff’s Department. Therefore, staff concludes that operation of the proposed BSPP would not require the need for new or expanded law enforcement facilities or staff levels within the BSPP regional or local study areas.

Schools

The Palo Verde Unified School District (PVUSD), and the Desert Center Unified School District in Desert Center serve the proposed BSPP site area (Solar Millennium2009a, p. 5.11-22). **Socioeconomics Table 10** identifies the schools plus the current and previous year’s student enrollment data in each of the respective school districts. As shown, the PVUSD, approximately 8 miles east of the BSPP site, offers a full range of educational opportunities with three elementary schools, one middle school, one high school, and a continuation high school. Desert Center Unified School District, approximately 35 miles west of the site consists of one elementary school.

Socioeconomics Table 11
Summary of Schools and Enrollment in Palo Verde and Desert Center School Districts

School Name	Community	Grades	Students	Pupil-to-Teacher Ratio	Average Class Size
Palo Verde Unified School District					
Felix J. Appleby Elementary School	Blythe	K-5			
2012–2013			571	—	—
2011–2012			531	19.7	19.7
Margaret White Elementary School	Blythe	K-5			
2012–2013			668	—	—
2011–2012			683	27.3	28.5
Ruth Brown Elementary School	Blythe	K-5			
2012–2013			633	—	—
2011–2012			713	27.4	28.5
Blythe Middle School	Blythe	6-8			
2012–2013			502	—	—
2011–2012			502	15.9	18.0
Palo Verde High School	Blythe	9-12			
2012–2013			955	—	—
2011–012			955	22.1	25.3
Twin Palms Continuation School	Blythe	9-12			
2012–2013			102	—	—
2011–2012			92	18.4	17.4
District Total	Blythe	K-12			
2012–2013			3,448	—	—
2011–2012			3,486	22.0	22.4
Desert Center Unified School District					
School Name	**Community**	**Grades**	**Students**	**Pupil-to-Teacher Ratio**	**Average Class Size**
Eagle Mountain Elementary School	Desert Center	K-8			
2012–2013			15	—	—
2011–2012			20	0	0
Riverside County					
Riverside County	County	K-12			
2012–2013			425,564	—	—
2011–2012			425,651	24.2	27.3

Source: CDE 2013

Construction. Staff assumes the construction workforce for the BSPP will be hired from within the available regional workforce, with up to 15 percent 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 BSPP 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 BSPP would not require the need for new or expanded PVUSD school facilities or staff levels.

Operation. The BSPP is proposed on BLM land, as was the previously approved project, therefore the provisions of Education Code section 17620 would not apply, and no school impact fees would be collected for the BSPP (CEC 2010g).

The operational workforce for the BSPP is expected to be hired from the available regional workforce. Up to 4 operational employees for the modified project, a decrease from the estimated 55 employees for the approved project could choose to relocate to the BSPP local area from more distant regional study area locations. At the time the approved project was under Energy Commission review, the PVUSD school district expected to have the necessary capacity to accommodate new students resulting from project (Solar Millennium2009a, p. 5.11-22). Based on the school data in **Socioeconomics Table 11**, staff concludes that any contribution of school-aged children from workers relocating for the BSPP would account for a small increase in the overall PVUSD student body. With the decrease in the required operational BSPP workforce from 55 to 4, staff does not anticipate the impacts to school capacity to worsen. Staff concludes that operation of the modified project would not necessitate new or expanded school facilities or staff levels within the BSPP regional or local study areas, which was also the conclusion for the approved project.

Parks and Recreation

The site is currently undeveloped, is not designated for active recreational use, and does not appear to be frequented as a regular recreational area (Solar Millennium2009a, p. 5.7-15). The nearest park facilities to the BSPP site are located within the city of Blythe, located approximately 8 miles east of the BSPP site. The city of Blythe Parks Department is responsible for the maintenance and upkeep of the area's seven parks and one pocket park (City of Blythe, 2009).

Construction. Staff assumes the construction workforce for the BSPP will be hired from within the available regional workforce, with up to 15 percent 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 BSPP construction onto either the local or regional study areas. As discussed above, staff concludes that camping and RV facility use would experience peak attendance from tourists during the summer and higher occupancy during the winter, thereby possibly reducing availability for construction workers seeking local area housing. Therefore, staff concludes that as a result of the modified project, construction employment, like the approved project, would not require new or expanded recreational facilities or staff levels within the BSPP regional or local study areas.

Operation. The operational workforce for the BSPP is expected to come from within the available regional workforce. It is possible that up to 4 operational employees could choose to relocate to the BSPP local area from more distant regional study area locations. Staff concludes that permanent employment associated with the modified project, like the approved project, would not necessitate new or expanded parks and recreational facilities or staff levels within the BSPP regional or local study areas.

NON-OPERATION AND CLOSURE

As described in the **Project Description** section of the **Executive Summary**, 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 Millennium2009a, p. 3-2). If the BSPP 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 Facility Closure Plan would be prepared three years prior to initiating a permanent facility closure and put into effect when permanent closure occurs. If the BSPP facility ceases operation temporarily, whether by plan or due to an unplanned incident (non-operation), a Repair/Restoration Plan for conducting the activities necessary to restore the facility to availability and reliable and/or improved performance would be prepared.. In general, the Facility Closure Plan would address any long-term, post-closure site maintenance and monitoring for the BSPP and all associated facilities, including 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 would be addressed in the Facility Closure Plan. Closure alternatives other than full site restoration, costs associated with the planned closure activities, funding sources for these activities, and conformance with applicable LORS would also be included in the Facility Closure Plan (Solar Millennium2009a, p. 3-2).

It is assumed that the number and type of workers required for non-operation and closure activities would be similar to that described above for construction of the BSPP. Also, staff assumes that, as for the construction of the BSPP, 15 percent of non-operation and closure workforce would temporarily relocate closer to the project site for non-operation and closure activities. The remaining 85 percent would be drawn from the regional and local study areas. As most workers are expected to reside within the study area, no impacts to existing population levels are expected to occur. Staff expects that, like the BSPP construction workforce, the workforce for non-operation and closure would have no impacts on housing, population, and police services. No significant impacts to the study area population would result from proposed BSPP non-operation and closure activities.

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 (Cal. Code Regs., tit. 14, §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, resulting in a housing shortage, change in local employment conditions, and an increased demand on public services.

Projects considered for the socioeconomic cumulative analysis are shown in **Socioeconomics Table 12a** and **Socioeconomics Table 12b**. Although not all of those projects are expected to complete the environmental review process, or to be funded and constructed, the list is indicative of the large number of large residential, commercial, and energy projects currently proposed in California.

The projects are defined within a geographic area that has been identified by staff as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements. Most of these projects have, are, or would be required to undergo their own independent environmental review under CEQA and/or the National Environmental Protection Act (NEPA).

GEOGRAPHIC EXTENT OF CUMULATIVE IMPACT ANALYSIS

The area of cumulative effect for socioeconomic resources is Riverside and San Bernardino counties, California, and La Paz County, Arizona. 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.

EFFECTS OF PAST AND PRESENT PROJECTS

A wide variety of past and present development projects contribute to the cumulative conditions for socioeconomics. As shown in **Socioeconomics Table 2**, from 2000 to 2010 the populations of Riverside and San Bernardino counties increased by 41.7 and 19.1 percent, respectively, while the population within La Paz County increased by 15.6 percent during the same time. 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 would be affected by reasonably foreseeable future projects such as large electrical generation and distribution infrastructure development projects proposed along the I-10 corridor (**Executive Summary Figure 1**) and solar and wind applications proposed on approximately 1,000,000 acres of BLM land in the California Desert District Planning Area. Also, a large number of solar generation and distribution infrastructure development projects proposed on non-federal land in the I-10 corridor would affect socioeconomics (**Socioeconomics Tables 12a** and **12b**).

<u>Contribution of the Blythe Solar Power Project to Cumulative Impacts</u>

Construction. Foreseeable development in the project area includes primarily renewable energy electrical generation and transmission infrastructure projects, with some residential and commercial development. Given the large number of renewable energy projects occurring within the BSPP regional study area, it is possible that some overlap of construction phasing could occur between the BSPP and the cumulative development projects. **Socioeconomics Table 12a** presents the most recently published data (Year 2010–2020 projections) on labor force characteristics for the cumulative regional study area pertaining to solar energy project construction labor skill sets and compares those to major cumulative projects located near the BSPP along the I-10 corridor, including the Palen Solar Electric Generating System (PSEGS), Rice Solar Energy Project (RSEP), and the Desert Sunlight PV Project (DSPV). **Socioeconomics Table 12b** presents a complete list of projects considered part of the socioeconomics cumulative analysis, including the map ID/feature that correlates with **Executive Summary Figure 1**, which shows the location of the projects.

Socioeconomics Table 12a
Cumulative Project Construction Employment Needs and Labor Supply

Trade	Total # of Workers for Project Construction by Craft – Peak Month					*TOTAL*	Riverside/San Bernardino/ Ontario MSA	
	Approved BSPP Project (Month 16)	Modified BSPP Project (Month 20)	PSEGS (Month 22)	RSEP (Month 12)	DSPV (Months 6-8)		2010	2020
Surveyor	16	0	4 (16*)	0	—	*4 (16*)*	440	520
Operator	94	20	106	0	—	*126*	2,510[1]	3,030[1]
Laborer	229	303	86 (122*)	52	—	*441*	11,870[2]	13,380[2]
Truck Driver	28	24	26 (34*)	0	—	*50*	22,530[3]	28,960[3]
Oiler	4	0	0	0	—	*0*	52,650[4]	57,040[4]
Carpenter	77	8	75 (125*)	50	—	*133*	10,140	10,450
Boilermaker	9	0	264	0	—	*264*	52,650[4]	57,040[4]
Paving Crew	0	0	0 (8*)	0	—	*0 (8*)*	400	490
Pipe Fitter	290	8	508	80	—	*596*	3,160[5]	3,570[5]
Pipe Layer	0	0	3	0	—	*3*	590	730
Electrician	81	34	359	56	—	*449*	4,000	4,520
Cement Finisher	80	0	9 (18*)	6	—	*15*	2,420	2,570
Ironworker	42	12	126 (133*)	32	—	*170*	700[6]	670[6]
Millwright	18	22	141 (149*)	16	—	*179*	140	140
Tradesman	8	0	Included with laborer	105[8]	—	*187*	11,870[2]	13,380[2]
Project Manager	2	0	19	0	—	*19*	5,000[9]	5,490[9]
Construction Manager	2	0	79	5	—	*84*	5,000[9]	5,490[9]
PM Assistant	2	0	43	0	—	*43*	5,000[9]	5,490[9]
Support	2	0	130	0	—	*130*	13,430[10]	15,360[10]
Support Assistant	2	0	178	0	—	*178*	38,240[11]	43,010[11]
Engineer	7	8	104	36	—	*148*	7,270	8,120
Timekeeper	2	0	10	0	—	*10*	1,840	2.120
Administrator	5	0	29	0	—	*29*	4,540[12]	5,240[12]
Welder	1	14	Included with boilermaker & pipefitter	0	—	*14*	2,650	3,090
Instrument Tech	0	0	12	0	—	*12*	620[13]	680[13]
Fencer	0	5	0	0	—	*5*	700	840

Trade	Total # of Workers for Project Construction by Craft – Peak Month					*TOTAL*	Riverside/San Bernardino/ Ontario MSA	
	Approved BSPP Project (Month 16)	Modified BSPP Project (Month 20)	PSEGS (Month 22)	RSEP (Month 12)	DSPV (Months 6-8)		2010	2020
Glazier	0	4	0	0	—	*4*	52,650[4]	57,040[4]
Insulation Installer	0	4	0	0	—	*4*	52,650[4]	57,040[4]
Landscaper	0	5	0	0	—	*5*	16,440	19,840
Mason	0	4	0	0	—	*4*	850	850
Painter	0	4	0	0	—	*4*	4,320	4,570
Pile Driver	0	10	0	0	—	*10*	2,510	3,030
Plumber	0	4	0	0	—	*4*	3,160	3,570
Sheet Metal Worker	0	6	0	0	—	*6*	1,440	1,580
Total Peak Month	*1,001*	*499*	*2,311*	*438*	*622*	*3,870*[14]	N/A	N/A
Local Housing Need[15]	*150*	*75*	*347*	*66*	*93*	*581*	N/A	N/A

Notes: — Data not available, N/A Not applicable. *Largest number of workers by trade. Where no number is included in parenthesis, number reported is the largest number of workers for the trade and during the peak project month, month 20.
1 The "Operating Engineers and Other Construction Equipment Operators" category was used. 2 "Construction Laborers" category was used. 3 The "Heavy and Tractor Trailer Truck Drivers" category was used. 4 The "Construction Trades Workers" category was used. 5 The "Plumbers, Pipefitters, and Steamfitters" category was used. 6 The "Structural Iron and Steel Workers" categories were used. 7 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. 8 Includes Teamsters, Heliostat Assembly Craft, Construction Staff, Subcontractors, and Technical Advisors. 9 The "Construction Managers" category was used. 10 The "Bookkeeping, Accounting, and Auditing Clerks" category was used. 11 The "Other Office and Administrative Support Workers" category was used. 12 The "First-Line Supervisors of Office and Administrative Support Workers" category was used. 13 The "Control and Valve Installers and Repairers, except mechanical door" category was used. 14 Total reflects the combined total peak month numbers for the BSPP, PSEGS, RSEP, and DSPV projects. 15 Assumes 15% of peak month workforce may seek temporary local housing during workweek.
Source: Solar Millennium 2009a and b; SR 2009a; BLM 2010c; NEBS 2013a; NEBS 2013j; NEBS2013k; Palen 2012a; and Palen 2013mm.

Socioeconomics 12b

Cumulative Projects for Socioeconomics

ID	Feature	Project Name	Location	Ownership	Status	Project Description	Distance (MILE)
12	Polygon	NextEra/ Florida Power & Light (FPL) McCoy	13 miles northwest of Blythe	McCoy Solar	FEIS completed. ROD issued March 2013. Project waiting for ROW.	Up to 750-MW solar PV project on 7,700 acres of BLM land and 470 acres of private land, with a 16-mile gen-tie	3
2	Line	Blythe Energy Project Transmission Line	From the Blythe Energy Project to Julian Hinds Substation	Blythe Energy, LLC	Existing	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, and installation of 6.7 miles of new 230-kV transmission line between Buck Substation and SCE's DPV1 500-kV transmission line	3
4	Line	Desert Southwest Transmission Line	118 miles in length, primarily parallel to DPV	Imperial Irrigation District	Approved	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	4
18	Polygon	Blythe Energy Project II	Near Blythe Airport	Blythe Energy	Approved	520-MW, combined-cycle power plant, on 30 acres within the Blythe Energy Project’s 76-acre site	5
9	Polygon	McCoy Soleil Project	10 miles northwest of Blythe	EnXco	Plan of Develop-ment (POD) submitted to Palm Springs BLM	300-MW solar power tower project located on 1,959 acres; Requires a 14-mile transmission line to the proposed SCE Colorado River Substation south of I-10	6
5	Line	Devers-Palo Verde No. 2 (DPV2) Trans-mission Line Project	From the Midpoint Substation to Devers Substation	SCE	California Public Utility Commission (CPUC) approved petition to modify request to construct CA-only portion, 11/2009	New 500-kV transmission line parallel to the existing DPV1 from Midway Substation, approximately 10 miles southeast 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	6

ID	Feature	Project Name	Location	Ownership	Status	Project Description	Distance (MILE)
3	Line	Green Energy Express Transmission Line Project	Eagle Mountain Substation to Southern California	Green Energy Express	Approved	70-mile, double-circuit, 500kV transmission line from Eagle Mt. Substation to Southern California	6
6	Point	Blythe Solar Power Generation Station 1	Blythe	South-western Solar Power	Approved	A planned 4.76-MW solar PV project, including 69 PV panels that stand 50 feet tall and 72 feet wide	6
14	Point	Blythe Mesa Solar I	Blythe	Renewable Resources Group	Under review	A planned 485-MW solar PV project on private land in Blythe	7
23	Polygon	Desert Quartzite	South of I-10, 8 miles southwest of Blythe	First Solar	Plan of Development submitted to BLM	600-MW solar PV project on 7,724 acres, adjacent to DPV1 transmission line and SCE Colorado River Substation	8
10	Polygon	Desert Center 50	Desert Center	US Solar Holdings	Under review	A planned 49.5 MW fixed flat panel photovoltaic solar power plant	9
8	Point	Colorado River Substation Expansion	10 miles southwest of Blythe	SCE	Approved 7/2011	500/230-kV substation, constructed in an area approximately 1,000 ft by 1,900 ft	9
7	Point	Twelve Residential Developments	Blythe	Various	Approved or under construction	12 residential development projects have been approved by the Blythe Planning Department: Vista Palo Verde, Van Weelden, Sonora South, Ranchette Estates, Irvine Assets, Chanslor Village, St. Joseph's Investments, Edgewater Lane, The Chanslor Place Phase IV, Cottonwood Meadows, Palo Verde Oasis. A total of 1,005 single-family residences are proposed	10
5	Polygon	Big Maria Vista Solar Project	North of I-10, 12 miles nw Blythe	Bullfrog Green Energy	POD submitted to BLM	500-MW solar PV project on 2,684 acres	10

ID	Feature	Project Name	Location	Ownership	Status	Project Description	Distance (MILE)
11	Point	Four Commercial Projects	Blythe	Various	Approved	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. Dates of construction unknown at this time	10
17	Polygon	EnXco	North of Wiley's Well Rd, east of Genesis Solar Energy Project	EnXco	POD submitted to BLM	300-MW solar PV project	11
25	Polygon	Mule Mountain III	Chuckwalla Valley	EnXco	Pending	200-MW Solar PV	12
24	Polygon	Chuckwalla Valley State Prison	19025 Wiley's Well Rd., Blythe, CA	CA Dept. of Corrections & Rehabilitation	Existing	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	12
27	Polygon	Palo Verde Mesa Solar Project	Northwest of Blythe	Renewable Resources Group	(NOP) Filed	486-MW Solar	15
13	Polygon	Palen Solar Power Project	10 miles east of Desert Center	Bright Source, Inc	Petition to Amend under Review at CEC	Two adjacent solar fields of 250 MW each are proposed for combined nominal output of approximately 500 MW. Each of the 250 MW solar fields will have a dedicated SRSG/Tower, solar field/heliostat array of approximately 170,000 heliostats, and a dedicated non-reheat Rankine-cycle steam turbine generator/power block.	27
1	Polygon	Rice Solar Energy Project	Rice Valley, Eastern Riverside County	Rice Solar Energy	Approved, construction date unknown at this time	150-MW solar power tower project with liquid salt storage; located on 1,410 acres; includes a 650 foot-tall power tower, an approximately 10-mile-long interconnection tie-line to the Western Parker-Blythe transmission line	27
26	Polygon	Graham Pass Wind Project	Riverside County	Graham Pass, Inc	Pending	175-MW Wind Project	30

ID	Feature	Project Name	Location	Ownership	Status	Project Description	Distance (MILE)
19	Polygon	Nextlight Quartzsite	Quartzsite, AZ	Nextlight Renewable Power	Pending	50-MW concentrated solar power plant, trough	31
4	Polygon	Quartzsite Solar Energy	10 miles north of Quartzsite	Solar Reserve	Draft EIS released	100-MW, 653-foot-tall power tower on 1,500 acres of BLM land	31
8	Polygon	Desert Lily Soleil Project	6 miles north of Desert Center	EnXco	POD submitted to BLM	100-MW solar PV project on 1,216 acres of BLM land	32
11	Polygon	Chuckwalla Solar I	1 mile north of Desert Center	Chuckwalla Solar I	POD submitted to BLM	200-MW solar PV project on 4,083 acres	33
28	Polygon	La Posa Solar Thermal	Stone Cabin, AZ	Pacific Solar Investments	Pending	2,000-MW Solar	34
10	Polygon	Desert Center 50	Desert Center	US Solar Holdings	Under review	A planned 49.5-MW fixed, flat-panel solar PV project	34
7	Polygon	Desert Harvest	6 miles north of Desert Center	EnXco	DEIS published	100-MW solar PV project on 930 acres	37
30	Polygon	Wildcat Quartzsite	Quartzsite, AZ	Wildcat Quartzsite Solar	Pending	800-MW concentrated solar power plant, tower	38
3	Polygon	Desert Sunlight Project	6 miles north of Desert Center	First Solar (GE, Sumitomo Corp and Nextera)	Approved	550-MW solar PV project on 4,144 acres of BLM land, requiring a 12-mile transmission line to the planned Red Bluff Substation. Construction has begun on this project.	39
2	Point	Eagle Mountain Pumped Storage Project	Eagle Mountain iron ore mine, north of Desert Center	Eagle Crest Energy	Federal Energy Regulatory Commission (FERC) draft EIS published in 12/2010	1,300-MW pumped storage energy-generation project on 2,200 acres of public and private land, designed to store off-peak energy to use during peak hours	45
33	Polygon	Ogilby Solar	Chocolate Mountain	Pacific Solar Investments	Revised POD 8/26/11	1,500-MW Solar Thermal Trough	51

ID	Feature	Project Name	Location	Ownership	Status	Project Description	Distance (MILE)
17	Point	Mount Signal Solar Farm #1	Calexico	82LV 8ME	EA pending	600-MW solar PV project on 1,440 acres	67

All cumulative projects identified in **Socioeconomics Table 12a and 12b** would be expected to draw on the large regional construction workforce in and around Riverside/San Bernardino/Ontario MSA. **Socioeconomics Table 12a** also identifies the labor force by skill for the MSA and the number of workers by skill to construct each project. Even in a worst-case scenario, should construction of these projects occur during overlapping peak work months, construction labor requirements would not exhaust the supply of construction labor by craft in the Riverside/San Bernardino/Ontario MSA. Other MSAs that could be a source of additional labor supply include the San Diego-Carlsbad-San Marcos MSA, El Centro MSA, and Santa Ana-Anaheim-Irvine Metropolitan Division. It is staff's opinion that there would be quite a few construction workers that would move from one project to another as their job at each project is completed. This could reduce the number of different construction workers seeking lodging closer to their project site. Specifically, there is currently a significant construction workforce working approximately 15 miles from the BSPP site, constructing the Genesis Solar Energy Project (GSEP). The GSEP has an estimated peak month construction workforce of 1,085 workers who are expected to be finishing their work in 2014 (GSEP 2009a). The project owner anticipates that many of these same workers would be employed for the construction of the BSPP, which would significantly reduce the number of new workers coming into the area (NEBS2013j).

While there is sufficient labor supply for the BSPP and the other cumulative projects, the large number of construction workers needed for the projects when considered cumulatively, particularly if peak construction periods overlap, could impact the amount of hotel/motel and housing units in the local and regional study area. By itself, the BSPP would not significantly impact the availability of local lodging supply. When considered cumulatively with the other projects, temporary lodging may be constrained in the local and regional study areas, thus contributing to a cumulative impact. Mr. Perez explained construction workers preference for lodging with easy access to Interstate 10, dining options, and convenience stores. As more construction workers come to work on the various cumulative projects, lodging availability in the more ideally-located communities (e.g. Indio, Blythe, Ehrenberg), could be more difficult to find, necessitating construction workers to turn to less ideally-located communities. A less ideally-located community would include communities further away from the project, communities without easy access to Interstate 10, or communities where lodging is higher priced. Also, more construction workers could choose to commute daily from their residence instead of moving closer to their job site.

Staff reviewed Google Earth and generated a table (Appendix A) that correlates the center point of each community by distance and travel time to BSPP. With the use of both these tools, staff identified the communities of Mesa Verde, Desert Center, Ripley, Coachella, Bermuda Dunes, Thousand Palms, Thermal, Mecca, and Quartzsite as possible areas for lodging. However, when staff researched hotels and motels in these communities, the only lodging shown was one motel in Thousand Palms, an expensive hotel in Bermuda Dunes, and numerous hotels and motels of varying prices in Indian Wells, Indio, Palm Springs, Palm Desert, and La Quinta. Housing data for these communities is provided in **Socioeconomics Tables 8a** and **8b**.

Staff concludes that added with other projects with overlapping construction schedules, the BSPP would contribute to a shortage of local and regional lodging. Approximately 1,005 single-family residential units (from 12 projects - ID/feature 23/point) are approved for construction in the city of Blythe and three residential developments are currently under construction. Riverside County approved a large residential development project with 16,665 units along the northwestern shores of Salton Sea (ID/feature 34/point). With these two projects, 17,670 residential units would be added to the BSPP regional study area over time. Staff does not know when these projects anticipate completion of construction, but it is reasonable to assume that at least some of the units between the two projects would have completed construction during the BSPP construction. Staff does not anticipate that new housing would need to be created to meet the temporary lodging needs of the BSPP and the other cumulative projects.

Even with the temporary population increase in the local and regional study area, cumulative construction activities would not necessitate new or expanded public services (police, schools, parks and recreation) in the local study area based on information from the local BCTC and the Riverside County Sheriff's Department. Mr. Perez with the local BCTC commented that construction workers for power plant projects tend to return to their residences on the weekend and when at the project site, they work their hours and go back to their temporary lodging in the evening. The Riverside County Sheriff's Department commented that there is a low probability that additional law enforcement services are needed during BSPP construction and operation, so it is likely that with the addition of the other projects in the cumulative setting, new or expanded law enforcement services would not be necessary. Construction workers do not tend to bring their families with them to their jobsite so new or expanded schools are not anticipated for the BSPP and the other projects in the cumulative setting. Staff does not anticipate that new or expanded parks and recreation services are necessary for the BSPP and other cumulative projects. Construction workers are not likely to spend much time visiting and using these resources.

In addition, short-term construction-related spending activities of the BSPP project are expected to have cumulative economic benefits for the study area (refer below to **Socioeconomics Table 14**). The cumulative benefits would increase when revenues accrued as a result of the proposed BSPP 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 modified project is expected to result in the potential permanent relocation of up to 4 workers into the local study area, versus 55 workers estimated for the approved project. **Socioeconomics 13** presents the most recently published data (Year 2010-2020 projections) on labor force characteristics for the cumulative regional study area pertaining to solar energy project operational labor skill sets and compares those to major cumulative projects located near the BSPP along the I-10 corridor, including the PSPP, GSEP, RSEP, and the DSPV.

Socioeconomics Table 13
Cumulative Project Operational Employment Needs

Trade	Total # of Workers for Project Operation						TOTAL		
	Approved BSPP	Modified BSPP	PSEGS	GSEP	RSEP	DSPV		Riverside/San Bernardino/Ontario MSA 2010	Riverside/San Bernardino/Ontario MSA 2020
Production Technicians[1]	--	14	--	--	--	--	--	1,770	1,910
High-Voltage Technician[2]	--	1	--	--	--	--	--	4,000	4,520
Total	*221*	*15*	*100*	*50*	*47*	*15*	*227*[4]	*5,770*	*6,430*
Local Housing Need[3]	*55*	*4*	*25*	*33*	*12*	*4*	*78*	--	--

[1]The “Plant and System Operators” category was used. [2]The “Electricians Solar Photovoltaic” category was used. [3]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. [4]Total adds up horizontally but not vertically due to availability of data.
Source: Solar Millennium 2009a and b, GSEP 2009a, SR 2009a, and BLM 2010c, NEBS2013a; NEBS2013j; Palen 2012a; and Palen 2013ss.

Socioeconomics Tables 8a and **8b** show there is enough housing in the local study area to house the 4 operational workers estimated to relocate closer to the project and enough housing for the other operations workers for the cumulative projects. The combined 17,600 housing units in Blythe and near the northwestern end of the Salton Sea could also be a source of housing for the operations workers for the cumulative projects. Staff does not anticipate a housing supply shortage for the operations workers for the cumulative projects. The small increase in the overall Palo Verde Unified School District student body from the BSPP would not pose a significant cumulative impact and when added to the other cumulative projects, it is not anticipated that the increased student enrollment would necessitate the provision of new or expanded school services. The Riverside County Sheriff's Department commented that additional law enforcement services would not be needed for project operations, so it is likely that with the addition of the other projects in the cumulative setting, new or expanded law enforcement services would not be necessary. Staff does not anticipate that the addition of the 4 BSPP operations workers in the local study area plus the operations workers for the other cumulative projects would result in the need for new or expanded parks and recreation services, particularly when existing and planned housing (cumulative projects) would have considered these services. Also, operations workers for the BSPP and the other cumulative projects may not all settle in the local study area, and instead settle in the regional study area, especially as operations workers are known to commute up to an hour in each direction to work on a power plant.

Closure. The closure of the BSPP is expected to result in similar cumulative impacts related to socioeconomics as BSPP construction impacts, as described above. It is unknown if the construction or closure of any of the cumulative projects would occur concurrently with the closure of this project, because the closure is not expected to occur for approximately 30 years from project start-up. Based on the cumulative impact analysis for BSPP construction activities the impacts of the closure of the BSPP would not be expected to contribute to cumulative impacts related to socioeconomics. Staff assumes that like the BSPP construction workforce, the non-operation closure workforce would be drawn from the regional and local study areas, and at most, 15 percent of the workforce would temporarily relocate closer to the site for closure activities.

COMPLIANCE WITH LORS

CALIFORNIA REVENUE & TAXATION CODE, SECTION 73

Solar projects are subject to property taxes and current law would qualify the BSPP for the exclusion of certain parts from valuation per the Revenue and Taxation Code, section 73, if the project were under construction by January 1, 2017. However, because the BSPP is located entirely on BLM lands and under Title 43, United States Code, section 1701, the federal government is immune from state and local taxes, property taxes would not be collected. The federal government can provide payments to compensate states and local governments for burdens created as a result of immunity (payment in lieu of taxes, or PILT) (43 U.S.C., § 1701, subd. (a)(13)).

NOTEWORTHY PUBLIC BENEFITS

For the purpose of this analysis, staff defines noteworthy public benefits to include changes in local economic activity and local tax revenue that would result from project construction and operation. Impact estimates reflect two different scenarios representing the construction and operation phases of the project. Economic impacts associated with the construction phase include substantial expenditures on materials and labor that would occur during the 48-month construction phase.

The economic model most commonly used is the IMPLAN input-output model, developed by the Minnesota IMPLAN Group (MIG). The model relies on complex input-output tables and social accounting matrices. These are quantitative representations of the purchaser-supplier relationships between producers and intermediate and final consumers. Based on these tables, the analyst can estimate the economic activity that would result from a given expenditure, or other economic event. The resulting economic impact estimates are divided into three categories. These are the direct, indirect, and induced economic impacts. Within each of these categories, the model estimates associated changes in employment, labor income, and economic output.[7] Direct economic effects represent the employment, labor income, and spending associated with construction or operation of the project itself. Indirect economic effects represent the expenditures on intermediate goods made by suppliers who provide goods and services to the project. Induced economic effects represent household spending that occurs due to the increased wages, salaries, and proprietor's income generated in the direct and indirect rounds.

Socioeconomics Table 14 provides a summary of economic and employment benefits of the approved project compared with the modified project. As the BSPP is completely on BLM land and the federal government is immune from state and local taxes, property taxes would not be collected. However, through payment in lieu of taxes the federal government can provide payments to compensate state and local governments for burdens created as a result of immunity (43 U.S.C., § 1701, subd. (a)(13)). The project owner has identified that an estimated $215,000 in annual property tax would be assessed on the project if it were sited on non-BLM land. Payment in lieu of taxes would be at the discretion of the BLM.

[7] The Minnesota IMPLAN Group (2012) defines Economic Output as "the value of industry production." In the manufacturing sector, output is equal to total sales, minus inventory changes. For the service sectors, output is equal to total sales. In the retail and wholesale trade sectors, output is equal to the gross margin (i.e., total sales, minus the cost of goods sold).

Socioeconomics Table 14
BSPP Economic Benefits

Fiscal Benefits	**Approved Project** (2009 dollars)	**Modified Project** (2011 dollars)
Estimated annual property taxes	$400,000[1]	$0 to $215,000[2]
State and local sales taxes: Construction	$910,000	$967,000 (annual)
State and local sales taxes: Operation	$840,000	$39,791 (annual)
School Impact Fee	$0	Not applicable
Non-Fiscal Benefits		
Capitol Cost	--	$1,131 million
Construction materials and supplies	$60.0 million	$17.2 million (total) ($4.3 million annual)
Operations and maintenance supplies	$9.6 million	$150,000 (annual)
Direct, Indirect, and Induced Benefits		
Estimated Direct Employment		
Construction	604 jobs (monthly average)	341 jobs (monthly average)
Income	$67 million	$43.3 million (annual) ($173 million total)
Operation	221 jobs	15 jobs
Income	$9.4 million	1.4 million (annual)
Estimated Indirect Employment		
Construction	309 jobs	9 jobs
Income	$15.0 million	$491,000 (annual)
Operation	71 jobs	0 jobs
Income	$5.0 million	$10,000 (annual)
Estimated Induced Employment		
Construction	209 jobs	271 jobs
Income	$14.0 million	$11.4 million (annual)
Operation	68 jobs	9 jobs
Income	$4.0 million	$368,000 (annual)

Notes:

1 At present, there is no property tax assessed on solar components (mirrors, solar boiler, heat exchangers) 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 $400,000 in annual property taxes.

2 As the BSPP is completely on BLM land and the federal government is immune from state and local taxes, property taxes would not be collected. However, the federal government can provide payments to compensate states and local governments for burdens created as a result of immunity (43 U.S.C., § 1701, subd. (a)(13)). An estimated $4.3 million would ordinarily be assessed which the federal government could pay to Riverside County, either in full, in part, or not at all.

Source: Solar Millennium, 2009a; NEBS2013j, NEBS2013k.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments related to socioeconomics for the BSPP.

CONCLUSIONS

No direct or indirect significant adverse socioeconomics impacts would occur as a result of the construction or operation of the modified project, like the approved project. However, when considered cumulatively with the other proposed and approved projects, temporary lodging may be constrained in the local and regional study areas, thus contributing to a cumulative impact. Staff does not anticipate that new housing would need to be created to meet the temporary lodging needs of the BSPP and the other cumulative projects. Even with the temporary population increase in the local and regional study area, cumulative construction activities would not necessitate new or expanded public services (police, schools, parks and recreation) in the local study area.

BSPP operations would not create a significant adverse socioeconomic cumulative impact. New or expanded law enforcement services would not be necessary and the increased student enrollment would not necessitate the provision of new or expanded school services. Staff does not anticipate that the addition of the four BSPP operations workers in the local study area plus the operations workers for the other cumulative projects would result in the need for new or expanded parks and recreation services, particularly when existing and planned housing (cumulative projects) would have considered these services.

The modified project, like the approved project, 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 possible benefit to public finance and local economies through taxation. These activities would have a positive effect on the local and regional economy.

PROPOSED CONDITIONS OF CERTIFICATION

Staff has proposed a new condition for Socioeconomics. There were no pervious conditions for Socioeconomics for the PSPP project. (**Note:** New text is <u>**bold and underlined**</u>)

<u>**SOCIO-1**</u> <u>**The project owner shall submit a “No Trespassing” letter to the satisfaction of the Colorado River Station of the Riverside County Sheriff’s Department. The “No Trespassing” letter shall remain on file throughout construction and operation of the project.**</u>

Verification: At least 30 days prior to the start of construction, the project owner shall provide a copy of the letter to the Colorado River Station of the Riverside County Sheriff's Department for review and to the CPM for review and approval.

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APPENDIX A

Start Location	County	Travel Time (minutes)	Distance (miles)
Mesa Verde CDP	Riverside	4	1.1
Ripley CDP	Riverside	12	10.1
Blythe	Riverside	13	7.3
Ehrenberg CDP	La Paz	20	20.6
Palo Verde CDP	Imperial	27	21.1
Quartzsite town	La Paz	30	30.6
Desert Center CDP	Riverside	38	42.8
Cibola CDP	La Paz	39	21.6
Poston CDP	La Paz	45	41.1
La Paz Valley CDP	La Paz	45	40.3
Vicksburg CDP	La Paz	52	55.8
Brenda CDP	La Paz	53	49.1
Salome CDP	La Paz	61	68.5
Utting CDP	La Paz	66	71.4
Parker town	La Paz	67	59.5
Bluewater CDP	La Paz	68	58.1
Wenden CDP	La Paz	69	73.7
Bluewater CDP	San Bernardino	69	59.8
Cienega Springs CDP	La Paz	71	62.2
Bouse CDP	La Paz	73	71.8
Big River CDP	San Bernardino	77	70.1
Indio	Riverside	78	90.6
Parker Strip CDP	La Paz	80	70.5
Coachella	Riverside	82	92.4
Bermuda Dunes CDP	Riverside	83	94.5
Desert Palms CDP	Riverside	84	95.5
Thermal CDP	Riverside	85	96.2
Mecca CDP	Riverside	88	83.2
Thousand Palms CDP	Riverside	88	100.4
Vista Santa Rosa CDP	Riverside	88	95.0
Sunwest CDP	La Paz	89	83.1
Brawley	Imperial	92	88.5
Palm Desert	Riverside	92	99.8
Cathedral City	Riverside	92	106.3
Rancho Mirage	Riverside	94	103.3
La Quinta	Riverside	94	97.5
Indian Wells	Riverside	95	100.5
Oasis CDP	Riverside	96	105.3
Winterhaven CDP	Imperial	96	85.8
Garnet CDP	Riverside	97	111.4
Indio Hills CDP	Riverside	97	107.6

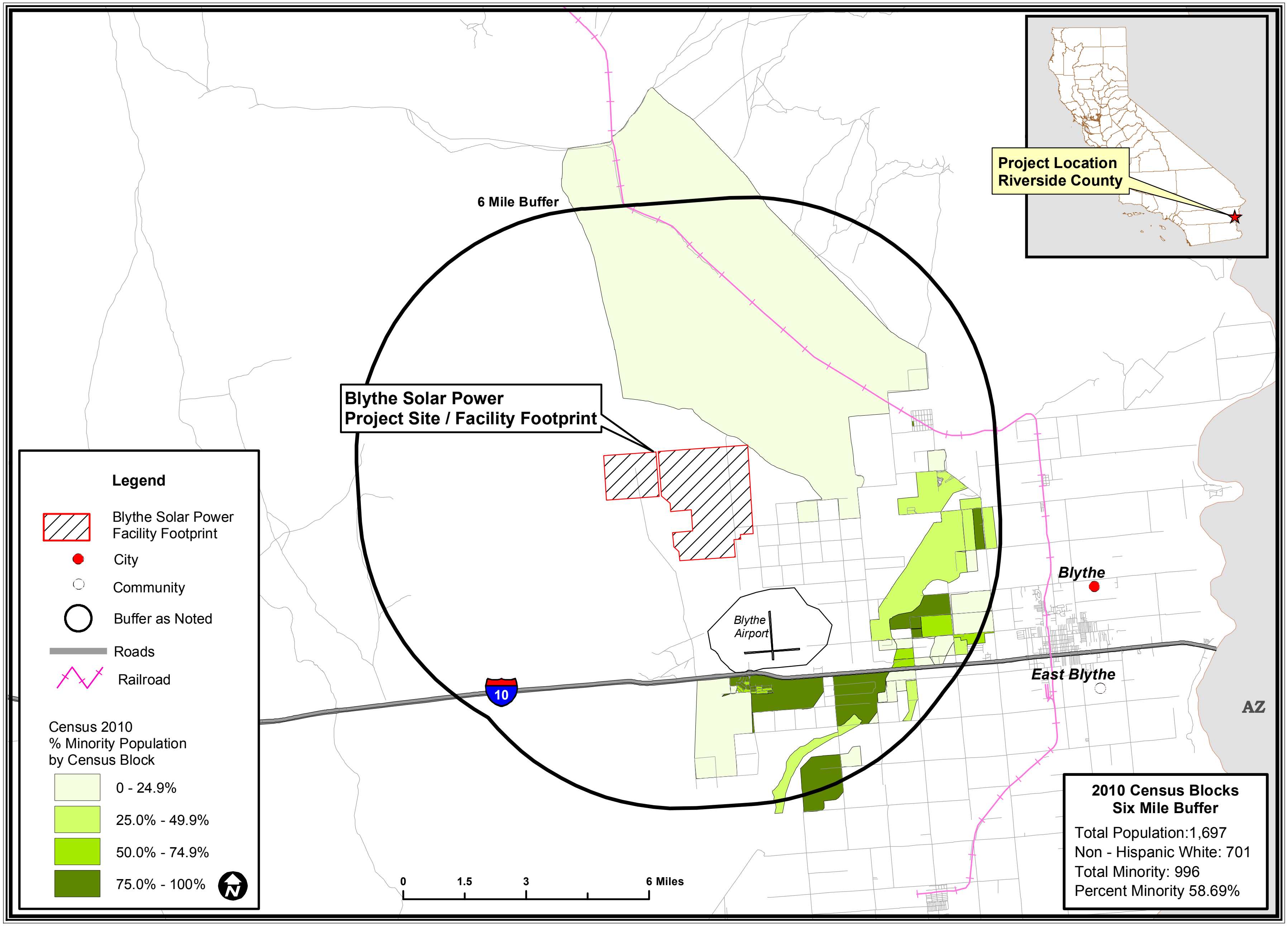
Start Location	County	Travel Time (minutes)	Distance (miles)
Sky Valley CDP	Riverside	98	107.6
Westmorland	Imperial	98	96.7
Desert Shores CDP	Imperial	100	113.4
Desert Edge CDP	Riverside	100	112.8
Holtville	Imperial	100	94.9
Desert Hot Springs	Riverside	101	115.6
Palm Springs	Riverside	102	110.0
Salton Sea Beach CDP	Imperial	103	116.2
Calipatria	Imperial	104	98.8
Whitewater CDP	Riverside	104	120.7
North Shore CDP	Riverside	105	91.5
Imperial	Imperial	107	100.3
Needles	San Bernardino	107	103.2
Cabazon CDP	Riverside	107	125.4
Heber CDP	Imperial	108	105.4
El Centro	Imperial	109	103.2
Salton City CDP	Imperial	110	123.1
Niland CDP	Imperial	110	105.8
Morongo Valley CDP	San Bernardino	110	127.1
Twentynine Palms	San Bernardino	111	120.4
Calexico	Imperial	112	107.6
Seeley CDP	Imperial	115	113.5
Bombay Beach CDP	Imperial	115	107.1
Calimesa	Riverside	119	142.8
Beaumont	Riverside	119	137.8
Yucca Valley town	San Bernardino	119	135.2
Cherry Valley CDP	Riverside	124	140.5
Joshua Tree CDP	San Bernardino	125	134.3
Banning	Riverside	127	138.2
Redlands	San Bernardino	128	151.6
Yucaipa	San Bernardino	130	147.4
San Jacinto	Riverside	130	146.8
Moreno Valley	Riverside	131	151.4
Ocotillo CDP	Imperial	131	131.2
Mentone CDP	San Bernardino	133	150.7
Oak Glen CDP	San Bernardino	135	146.8
Lakeview CDP	Riverside	136	152.6
March ARB CDP	Riverside	136	160.2
Anza CDP	Riverside	136	133.8
Loma Linda	San Bernardino	136	157.9
Highland	San Bernardino	137	158.4
Homestead Valley CDP	San Bernardino	137	148.6
Nuevo CDP	Riverside	139	155.3

Start Location	County	Travel Time (minutes)	Distance (miles)
Hemet	Riverside	140	151.8
Colton	San Bernardino	140	161.6
Grand Terrace	San Bernardino	140	162.0
Green Acres CDP	Riverside	140	154.8
San Bernardino	San Bernardino	141	165.3
Mountain Center CDP	Riverside	141	138.6
Sunnyslope CDP	Riverside	142	166.0
Homeland CDP	Riverside	142	156.8
Winchester CDP	Riverside	142	156.2
Bloomington CDP	San Bernardino	142	165.6
Crestmore Heights CDP	Riverside	143	164.6
Valle Vista CDP	Riverside	143	154.2
Mead Valley CDP	Riverside	144	165.4
Rubidoux CDP	Riverside	144	165.0
Riverside	Riverside	144	165.6
Romoland CDP	Riverside	144	158.1
Woodcrest CDP	Riverside	145	165.7
East Hemet CDP	Riverside	145	153.2
Glen Avon CDP	Riverside	146	168.7
Lake Riverside CDP	Riverside	146	140.1
Muscoy CDP	San Bernardino	146	168.0
Perris	Riverside	147	168.6
Highgrove CDP	Riverside	147	165.0
Idyllwild-Pine Cove CDP	Riverside	147	142.2
Aguanga CDP	Riverside	147	145.1
Rialto	San Bernardino	149	168.2
Good Hope CDP	Riverside	149	170.8
Pedley CDP	Riverside	149	168.3
Fontana	San Bernardino	150	170.7
Home Gardens CDP	Riverside	151	174.0
El Sobrante CDP	Riverside	152	173.1
Meadowbrook CDP	Riverside	152	173.5
Ontario	San Bernardino	152	176.4
Mira Loma CDP	Riverside	152	173.2
Lake Mathews CDP	Riverside	153	169.5
Menifee	Riverside	153	175.3
Alamo Lake CDP	La Paz	154	106.2
Warm Springs CDP	Riverside	154	176.7
French Valley CDP	Riverside	155	165.3
Eastvale CDP	Riverside	155	177.8
Coronita CDP	Riverside	155	179.1
Norco	Riverside	156	178.2
Rancho Cucamonga	San Bernardino	156	179.9

Start Location	County	Travel Time (minutes)	Distance (miles)
Corona	Riverside	156	177.7
El Cerrito CDP	Riverside	156	178.8
Running Springs CDP	San Bernardino	157	174.2
Crestline CDP	San Bernardino	157	175.7
Montclair	San Bernardino	157	183.3
Canyon Lake	Riverside	157	177.5
Lake Elsinore	Riverside	158	177.6
Murrieta	Riverside	159	184.3
Upland	San Bernardino	160	182.4
San Antonio Heights CDP	San Bernardino	161	187.1
Lucerne Valley CDP	San Bernardino	161	177.7
Lytle Creek CDP	San Bernardino	162	182.9
Temescal Valley CDP	Riverside	162	185.3
Oak Hills CDP	San Bernardino	163	188.0
Chino	San Bernardino	163	182.9
Wildomar	Riverside	164	186.0
Temecula	Riverside	166	174.0
Lakeland Village CDP	Riverside	167	182.4
Chino Hills	San Bernardino	168	191.5
Lake Arrowhead CDP	San Bernardino	169	182.1
Hesperia	San Bernardino	170	193.9
Wrightwood CDP	San Bernardino	171	193.4
Piñon Hills CDP	San Bernardino	171	193.4
Mountain View Acres CDP	San Bernardino	172	197.7
Victorville	San Bernardino	175	200.8
Phelan CDP	San Bernardino	176	194.8
Spring Valley Lake CDP	San Bernardino	177	200.5
Adelanto	San Bernardino	179	203.1
Apple Valley town	San Bernardino	180	206.2
Big Bear Lake	San Bernardino	187	190.8
Silver Lakes CDP	San Bernardino	191	216.1
Big Bear City CDP	San Bernardino	191	192.4
Barstow	San Bernardino	197	230.1
Lenwood CDP	San Bernardino	198	229.6
Baker CDP	San Bernardino	228	229.9
Fort Irwin CDP	San Bernardino	236	267.7
Searles Valley CDP	San Bernardino	279	295.5

SOCIOECONOMICS - FIGURE 1

Blythe Solar Power Project- Amendment - Census 2010 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 2013 - Census 2010 PL 94-171

SOIL AND WATER RESOURCES

Testimony of Abdel-Karim Abulaban, P.E.

SUMMARY OF CONCLUSIONS

The California Energy Commission staff (staff) has determined that construction, operation, and closure of the proposed Modified Blythe Solar Power Project (Modified BSPP) could potentially impact soil and water resources. Where these potential impacts have been identified, staff has proposed mitigation measures, as conditions of certification to reduce identified impacts to levels that are less than significant. If recommended conditions of certification are implemented, the project would conform to all applicable laws, ordinances, regulations and standards (LORS).

A summary of proposed modifications to the Soil & Water Resources Conditions of Certification is shown in Soil & Water Resources Table 1.

Soil & Water Resources Table 1
Summary of Proposed Modifications to Conditions of Certification

Condition of Certification	Proposed Modification(s) to Condition
SOIL&WATER-1	**Drainage Erosion And Sedimentation Control Plan** (DESCP): Edit to item N which references SOIL&WATER-15.
SOIL&WATER-2	**Mitigation Of Colorado River Impacts**: No change.
SOIL&WATER-3	**Project Groundwater Wells, Pre-Well Installation**: No change.
SOIL&WATER-4	**Construction And Operation Water Use**: Revise to change the limit of water usage and construction duration consistent with the project description.
SOIL&WATER-5	**Groundwater Level Monitoring, Mitigation And Reporting**: No change.
SOIL&WATER-6	**Compensation For Well Impacts**: No change.
SOIL&WATER-7	**Waste Discharge Requirements**: Revise requirements specified in Appendix B, C, and D consistent with the modified project.
SOIL&WATER-8	**Septic System And Leach Field Requirements**: No change.
SOIL&WATER -9	**Groundwater Production Monitoring**: No change
SOIL&WATER-10	**Facility Closure Plan**: Text changed to match language in the **General Conditions** section..

Condition of Certification	Proposed Modification(s) to Condition
SOIL&WATER-11	**Revised Project Drainage Report And Plans**: Edit to remove references to collector channels, conveyance channels, channel confluences, swales, HTF, soil cement, and drop structures.
SOIL&WATER-12	**Detailed Flo-2D Analysis**: Revise to remove references to collector channels, end diffuser structures, and berms.
SOIL&WATER-13	**Drainage Channel Design**: Delete.
SOIL&WATER-14	**Channel Erosion Protection**: Delete.
SOIL&WATER-15	**Channel Maintenance Program**: Delete.
SOIL&WATER-16	**Estimation Of Colorado River Impacts**: No change
SOIL&WATER-17	**Groundwater Quality Monitoring And Reporting Plan**: No change.
SOIL&WATER-18	**Non-Transient, Non-Community Water System**: Revise to require compliance with Riverside County Ordinance regarding water quality for groundwater wells.
SOIL&WATER-19	**Storm Water Damage Monitoring and Response Plan**: NEW

Compared to the approved project, the modified project would result in a substantial reduction in the environmental impacts related to soil and water resources. Impacts of the modified project on soil and water resources are summarized below:

- Water needs for the construction and operation of the modified project are only 1,200 af and 40 afy, respectively, representing small fractions of the corresponding construction and operation water needs of 4,100 af and 600 afy for the approved project, respectively.
- The substantial reduction in construction and operation water demand of the project will result in a reduction of potential impacts on nearby well owners and on underflow from the Colorado River.
- Photovoltaic technology does not require as much grading of the site as solar trough technology, which was to be used by the approved project, and therefore potential soil losses due to water and wind erosion would be substantially reduced for the modified project.
- Use of a heat transfer fluid (HTF) has been eliminated for the modified project, thereby eliminating any potential for contamination from the HTF fluid due to accidental spills. Additionally, the land treatment units that were going to be installed to treat wastewater that might be contaminated by the HTF have been eliminated.

- Quantities of wastewater generated by the groundwater treatment unit will be greatly reduced and thus the size of the evaporation ponds required for the modified project is substantially smaller than that for the approved project.
- Impacts related to flooding, erosion, and sedimentation of the modified project will be substantially reduced.
- Drainage conditions associated with the 10-, 25-, 50-, and 100-year precipitation events at or downslope of the modified project will not be significantly impacted.

INTRODUCTION

NextEra Blythe Solar Energy Center, LLC (NextEra Blythe Solar) proposes to construct, own, and operate a photovoltaic (PV) solar project, the Modified BSPP. The project is a PV solar electric generating facility with four adjacent, and independent solar plants, three of which will have a nominal capacity of 125 megawatts (MW) each, and the forth one 110 MW, for a total nominal capacity of 485 MW.

This Staff Assessment (SA) 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 SA was prepared. The SA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by CEQA.

METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Significance criteria are based on those listed in CEQA Appendix G. Hydrology and water resources impacts would be significant if the project would:

- violate any water quality standards or waste discharge requirements;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite/offsite;
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite/offsite;
- create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

- otherwise substantially degrade surface water or groundwater quality;
- place structures within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- have impacts that are individually limited, but cumulatively considerable. ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Soil & Water Resources Table 2
Laws, Ordinances, Regulations, and Standards and Policies

Applicable Law	Description
Federal	
Clean Water Act of 1977 (Including 1987 Amendments) Sections 401, 402 and 404	The primary objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the Nation’s surface waters. Section 401: Requires certification that the proposed project is in compliance with established water quality standards. Section 402: Direct and indirect discharges and storm water discharges into waters of the United States must be made pursuant to a National Pollutant Discharge Elimination System (NPDES) permit. Section 404: Activities resulting in the dredging or filling of jurisdictional waters of the U.S. require authorization under a Section 404 permit issued by the U.S. Army Corp of Engineers (USACE).
State	
State of California Constitution Article X, Section 2	Prohibits the waste or unreasonable use of water, regulates the method of use and method of diversion of water and requires all water users to conserve and reuse available water supplies to the maximum extent possible.

Applicable Law	Description
SWRCB Order 2009-0009-DWQ	The State Water Resources Control Board (SWRCB) regulates storm water discharges associated with construction affecting areas greater than or equal to 1 acre to protect state waters. Under Order 2009-0009-DWQ, the SWRCB has issued a NPDES General Permit for storm water discharges associated with construction activity.
SWRCB Order 97-03-DWQ	The SWRCB regulates storm water discharges associated with several types of facilities, including steam electric generating facilities. Under Order 97-03-DWQ, the SWRCB has issued a NPDES General Permit for storm water discharges associated with industrial activity.
California Water Code Section 461	Stipulates that the primary interest of the people of the State of California is the conservation of all available water resources.
California Water Code Section 1200 "Water Rights"	California's water rights law is a hybrid system in that the use of certain types of water requires a permit from the SWRCB, while other types of uses are governed by common law.
The Porter-Cologne Water Quality Control Act of 1967, California Water Code Section 13000 et seq.	Requires the SWRCB and the nine Regional Water Quality Control Boards (RWQCBs) to adopt water quality standards to protect State waters. Those standards include the identification of beneficial uses, narrative and numerical water quality criteria, and implementation procedures.
California Code of Regulations Title 23, Division 3, Chapter 9	This chapter requires the Colorado River Basin RWQCB (CRBRWQCB) to issue a report of waste discharge for discharges of waste to land pursuant to the Water Code.
California Code of Regulations Title 23, Division 3, Chapter 15	Regulates all discharges of hazardous waste to land that may affect water quality.
State Policies and Guidance	
SWRCB Res. 68-16	Anti-Degradation Policy: This policy restricts degradation of surface and ground waters. In particular, this policy protects water bodies where existing quality is higher than necessary for the protection of beneficial uses.
SWRCB Res. 77-01	Water Reclamation Policy: Under this policy, the SWRCB and CRBRWQCBs shall encourage reclamation and reuse of water in water-short areas.
SWRCB Res. 92-49	Policies and Procedures for Investigations and Clean-up and Abatement of Discharges Under CWC Section 13304: Under this policy, clean-up and abatement actions are to implement applicable provisions of Title 23 CCR Chapter 15, to the extent feasible.

Applicable Law	Description
State Water Policy	The Energy Commission has five authoritative sources for statements of policy relating to water use in California applicable to power plants. They are the California Constitution, the Warren-Alquist Act, the Commission's restatement of the state's water policy in the 2003 Integrated Energy Policy Report ("IEPR"), the State Water Resources Control Board resolutions (in particular Resolutions 75-58 and 88-63), and a letter from the Board to the Energy Commission interpreting Resolutions 75-58 and 88-63 [collectively referred to as the state's water policies - see Genesis Solar Project (09-AFC-08)].
Local	
Riverside County Ordinance Code, Title 13, Chapter 13.20	Establishes requirements to construct and operate groundwater wells.
Riverside County Ordinance Code, Title 8, Chapter 8.124	Establishes requirements to construct and operate sanitary wastewater disposal systems.
Riverside County Title 15 Chapter 15.24 Uniform Plumbing Code	Adopts by reference the California Plumbing Code, including the appendix and standards, for the installation and inspection of plumbing systems as a means of promoting the public's health, safety and welfare.
Riverside County Title 15 Chapter 15.80 Regulating Flood Hazard Areas and Implementing the National Flood Insurance Program	This ordinance was developed to comply with Title 44 CFR Part 65 regarding requirements for the identification and mapping of areas identified as Federal Emergency Management Agency (FEMA) Special Flood Hazard Areas.

DESCRIPTION OF APPROVED PROJECT

The Approved BSPP was to consist of four adjacent, independent, and identical units of 250-MW nominal capacity each for a total nominal capacity of 1,000 MW. The proposed total acreage for the site was approximately 7,043 acres of BLM land, including linear facilities. The project was to utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors would collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola to bring a heat transfer fluid (HTF) to high temperature (750°F) as it circulated through the receiver tubes. The HTF would then be piped through a series of heat exchangers where it would release its stored heat to generate high pressure steam. The steam would then be fed to a traditional steam turbine generator where electricity would be produced. Dry cooling technology would be used. Individual components of the approved project included:

- Solar Field and Power Block #1 (northeast);
- Solar Field and Power Block #2 (northwest);
- Solar Field and Power Block #3 (southwest);
- Solar Field and Power Block #4 (southeast);
- Access road to on-site office from and upgrades to a portion of Black Rock Road;
- Warehouse/maintenance building, assembly hall, and laydown area;
- Telecommunications lines;
- Natural gas pipeline;
- Concrete batch plant;
- Fuel depot;
- On-site transmission facilities, including central internal switchyard;
- 230 kilovolt (kV), double-circuit gen-tie line interconnecting to the Colorado River Substation (CRS);
- Groundwater wells used for water supply; and
- Distribution/construction power line.

During the Energy Commission's licensing process, Soil and Water Resources staff concluded that the BSPP, as originally proposed, would have significant environmental impacts that could be mitigated to less than significant levels with the implementation of proposed conditions of certification. The conditions of certification assure that the project's direct, indirect, and cumulative adverse environmental impacts would be mitigated to the extent feasible. In the final decision it was determined that the BSPP is required for public convenience and necessity, and that there were not more prudent and feasible means of achieving such public convenience and necessity. Also, the benefits of the BSPP outweigh any direct, indirect, or cumulative adverse impacts which may result from its construction or operation. The evidence of record established that no feasible site or generation technology alternatives to the project, as described during the licensing proceedings, existed which would reduce or eliminate any significant environmental impacts of the mitigated project.

SUMMARY OF PROPOSED PROJECT MODIFICATIONS

The Modified BSPP includes replacing the solar thermal technology completely with PV generating technology and reducing the physical size of the project. Linear access to the site would be the same as the approved BSPP, and the Modified BSPP would continue to interconnect to the regional transmission grid via the same proposed gen-tie line to Southern California Edison's (SCE's) CRS, which is currently under construction.

NextEra Blythe Solar proposes to develop the BSPP in four operational phases designed to generate a total of approximately 485 MW of electricity. The first three units (phases) would consist of approximately 125 MW alternating current (AC) each. The fourth unit would generate approximately 110 MW AC. The transmission corridor is located in the center of the site with the exact location to be determined during final design.

NextEra Blythe Solar has not selected the specific PV modules nor has it decided on whether a single-axis tracking modular system, fixed-tilt system, or combination of the two systems would be installed. While both systems are similar in how they generate and distribute electricity, the orientation and technique for collection of the sun's energy, as well as the number of panels and supports may be different. NextEra Blythe Solar is requesting the Energy Commission's Final Decision be amended in such a way as to allow the specific combination of technologies to be selected prior to construction without the need for filing another amendment.

During operations, all four units would share an operations and maintenance facility, one on-site switchyard, access and maintenance roads (either dirt, gravel, or paved), perimeter fencing and other ancillary security facilities, and a 230-kV gen-tie line.

The Modified BSPP would be located entirely on public land within BLM ROW #CACA–048811. The total proposed acreage for the solar plant site is approximately 4,070 acres, excluding linear facilities outside of the proposed solar plant site.

The primary modifications to the approved BSPP pertaining to Soil and Water Resources are as follows:

- Replacement of concentration solar parabolic trough and associated HTF collection and circulation system with PV modules;
- Elimination of all the power blocks and cooling towers;
- Reduction in the number of water treatment facilities from four to one;
- Reduction in the acreage of evaporation ponds from 32 acres to 12 acres;
- Addition of inverter pads;
- Substantial reduction in grading of the site to accommodate the PV modules;
- Elimination of the large drainage control channels; and
- Reduction of water use from 4,100 af (acre-feet) to 1,200 af during construction, and from 600 acre-feet per year (afy) to 40 afy for project operation.

The list above largely encompasses the items that were eliminated or reduced by the switch in technology from parabolic trough/concentrating solar thermal to PV technology. There would also be a reduction of approximately 3,000 acres in the size of the BSPP footprint.

The project would be constructed on 4,070 acres approximately 8 miles northwest of Blythe, California in Riverside County, California. The proposed project site is located approximately 2 miles north of U.S. Interstate-10 (I-10). The Colorado River runs northerly-southerly about 13 miles east of the project site. The property is located entirely on BLM land that was partially disturbed by the approved project.

The project will use PV solar technology to generate electricity; arrays of PV panels convert solar energy from the sun into electric energy. Units will share a main office building, a main warehouse, a maintenance building, parking lot, a main switchyard, and other support facilities. The project will produce two primary wastewater streams:

- Non-reusable sanitary wastewater produced from administrative centers and operator stations; and
- Reusable reverse osmosis (RO) and demineralized reject water that will be sent to a high efficiency reverse osmosis (HERO) type system, or concentrated to minimize water streams to the evaporation ponds.

The modified project will no longer have the four power blocks, and therefore the waste streams from those power blocks have been eliminated. Sanitary wastes will be collected for treatment in septic tanks and disposed via leach fields. The sanitary waste stream is collected from sinks, toilets, showers, and other sanitary facilities in the O&M building.

The second wastewater stream that includes RO reject water will be directed to one of two 6-acre evaporation ponds that will be located at the center of the project site. The evaporation ponds will be double-lined.

Two 6-acre evaporation ponds will be constructed to treat wastewater from the RO treatment unit that will treat groundwater for project use. These two evaporation ponds with a total surface area of 12 acres will replace the eight 4-acre (32 acres total) evaporation ponds for the approved project. The ponds will be designed and permitted as Class II Surface Impoundments in accordance with Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) requirements, as well as the requirements of the California Integrated Waste Management Board (CIWMB). Multiple ponds are planned to allow plant operations to continue in the event a pond needs to be taken out of service for some reason, *e.g.,* needed maintenance. Each pond will have enough surface area so the evaporation rate exceeds the wastewater production rate at maximum design conditions and annual average conditions.

The average pond depth is 5 feet and residual precipitated solids will be removed at the end of the project life (~30 years) to maintain a solids depth no greater than approximately 1 foot for operational and safety purposes. The ponds will maintain a minimum of 2 feet of freeboard to minimize the potential for overtopping due to 100-year recurrence interval rainfall event.

The pond liner system will consist of a 60 milli-inch high density polyethylene (HDPE) primary liner and a secondary 40 mil HDPE liner. Between the liners is a synthetic drainage geonet and collection piping that is used as part of the leachate collection and removal system (LCRS). There will be a hard surface protective layer on top of the 60 mil HPDE which will consist of a hard surface media such as reinforced concrete, roller compacted concrete, revetments, or combinations of these media will be assessed prior to the selection of the preferred option. The hard surface provides protection against accidental damage to the HDPE from falling objects, varying climatic conditions, and worker activities during cleanout and maintenance. Monitoring of the evaporation ponds will be required to detect the presence of liquid and/or constituents of concern.

The Modified BSPP will use 30-40 afy of water that will be pumped from onsite groundwater wells. The water will be used primarily for solar panel washing and sanitary uses.

Construction Water Use

The project proposes to construct four generating units in four phases (units) over the course of 48 months. Total water consumption over the 48 months is anticipated to be consumptive uses:

- Dust suppression
- Soil compaction
- Construction/grading requirements

Domestic potable water will either either be brought on site in trucks and held in day tanks or groundwater could be used with a package of water treatment systems to treat the water to meet potable standards. The annual average water consumption during construction is assumed to be approximately 300 afy.

Operational Water Use

During project operation, the project would use water primarily for solar panel washing and domestic needs, and would use about 30-40 afy of groundwater from onsite wells for operational supply. Assuming continuous uninterrupted supply, a yearly volume of 40 af which corresponds to an average flow rate of approximately 26 gallons per minute (gpm) based on 24 hours per day, 350 days per year. The peak water usage during the summer months is about 32,000 gallons per day (gpd) or about 22 gpm, assuming continuous pumping. Water use during the winter months is estimated to be between about 7,800 gpd, or a pumping rate of about 5 gpm, assuming continuous use. Over the project’s 30-year life, water use for project operation is expected to be approximately 1,200 af.

The Modified BSPP will use water for solar panel washing, sanitary uses, and dust suppression only.

Estimates for water usage are based on:

- Solar mirror washing – experience at other locations with similar climatic conditions;
- Domestic potable use – number of employees and number of hours expected to be worked during the year. An average consumption of 37 gallons per person per day was assumed; and
- Dust suppression – concentrate from the water treatment process is proposed for this purpose.

Setting and Existing Conditions

The project site is located in the northwestern Colorado Desert, which is part of the greater Colorado Desert Geomorphic Province. The Colorado Desert Geomorphic Province is characterized by isolated mountain ranges separated by broad alluvium-filled basins of Cenozoic-age sedimentary and volcanic materials overlying older rocks. Much of the Colorado Desert lies at low elevations, with some areas below sea level.

The Project is located in the alluvial-filled basin of the Palo Verde Mesa in eastern Riverside County, California, approximately eight miles west of the City of Blythe. The area is characterized by barren mountain ranges and isolated hills with broad alluvial-filled valleys. Beneath the Palo Verde Mesa lies the Palo Verde Mesa Groundwater Basin (PVMGB), which is bounded by non-water-bearing rocks of the Big Maria and Little Maria mountains to the north, by the McCoy and Mule Mountains to the west, and by the Palo Verde Mountains to the south (**Soil and Water Figure 1**).

To the east are the Palo Verde Valley and the Colorado River. The Big Maria Mountains and the McCoy Mountains are the contributing watersheds to the Palo Verde Mesa. McCoy Wash, a tributary of the Colorado River, flows southeast at the northeastern-most part of the site. Surface water drains from the surrounding mountains toward the Colorado River. There are no perennial streams on the Palo Verde Mesa. The PVMGB encompasses an area of about 353 square miles or 226,000 acres.

Because the project's only linear facility (its transmission line) would not require water as part of its operation, and only minimal amounts during construction, the following discussion focuses on water uses anticipated to support construction and operation of facilities at the project site only. In addition, there are no proposed changes to the transmission line from the originally licensed project thus no further assessment is required.

Physiography

The Palo Verde Mesa has a generally low relief until near the surrounding mountains (McCoy, Big Maria, and Little Maria Mountains). There are two distinct river-cut terraces that form a topographic break westward from the Colorado River. The project site is located on the uppermost of the two terraces that comprise the mesa. Approximately three miles east of the eastern site boundary, a sharp break in the slope forms the boundary between the Palo Verde Mesa and the Palo Verde Valley, which is 80 to 130 feet below the mesa. In this region, the Palo Verde Valley is roughly equivalent to the recent historic floodplain of the Colorado River.

Regionally, the ground surface slopes gently downward in a southeast direction at a gradient of less than 1 percent. Topography at the project site slopes gently away from the McCoy Mountains from the west to the southeast. The existing topographic conditions of the project site show an average slope of approximately one foot in 67 feet (1.50 percent) toward the east on the west side of the site and approximately one foot in 200 feet (0.50 percent) toward the southeast on the east side of the site. Steeper grades (10 to 15 percent) are present along the western side of the unnamed mound in Sections 5, 6, and 7 (T06S R22E).

Ground surface elevations at the project site range from 830 feet above mean sea level (msl) in the west to 410 feet above msl in the east (United State Geological Survey [USGS] 1975, 1983 and Towill 2009).

Climate and Precipitation

The climate in the Palo Verde Mesa, which is classified as a “low desert,” is characterized by high aridity and low precipitation. The region experiences a wide variation in temperature, with very hot summer months with an average maximum temperature of 108 ºF in July and cold dry winters with an average minimum temperature of 66.7 ºF in December. The Blythe area receives approximately 3.5 inches of rainfall per year. The majority of the rainfall occurs during the winter months, but rainfall during the late summer is not uncommon. The summer rainfall events tend to be a result of tropical storms that have a short duration and a higher intensity than the winter rains. Annual precipitation ranges from 0.02 to 0.47 inches per month for a total annual precipitation of just under four inches per year. **Soil and Water Table 3** and **Soil and Water Table 4** display the average monthly and annual minimum and maximum temperatures and precipitation (rainfall) from 1913 to 2008 collected from the Blythe Airport, located approximately one mile southeast of the Project site.

Soil and Water Table 3
Climate Temperature Data for Blythe Airport, California

Month	Temperatures °F					Mean Number of Days			
	Monthly Averages			Record Extremes		Max. Temp.		Min. Temp.	
	Daily Max.	Daily Min.	Monthly	Record High	Record Low	90°F & Above	32°F & Below	32°F & Below	0°F & Below
Jan	66.7	41.5	54.1	89	20	0	0	2.7	0
Feb	72	45.4	58.7	93	22	0.2	0	0.8	0
Mar	78.4	50.2	64.3	100	30	3.1	0	0.1	0
Apr	86.4	56.5	71.5	107	38	11.6	0	0	0
May	95.2	64.4	79.8	114	43	23.8	0	0	0
Jun	104.5	72.7	88.6	123	46	29	0	0	0
Jul	108.4	81	94.7	123	62	30.9	0	0	0
Aug	106.6	80.2	93.4	120	62	30.6	0	0	0
Sep	101.3	73	87.2	121	51	28.4	0	0	0
Oct	89.8	60.9	75.3	111	27	17.6	0	0	0
Nov	75.8	48.6	62.2	95	27	0.8	0	0.1	0
Dec	66.7	41.2	53.9	87	24	0	0	1.8	0
Year	87.7	59.6	73.6	123	20	175.9	0	5.5	0

Source: Western Regional Climate Center (WRCC) 2009.

Average annual precipitation in the project area, based on the gauging station at Blythe Airport, is 3.59 inches, with August recording the highest monthly average of 0.64 inches and June recording the lowest monthly average of 0.02 inches.

Soil and Water Table 5 presents average monthly evapotranspiration rates for various stations located in the region.

Soil and Water Table 4
Precipitation Data for Blythe Airport, California

Month	Rainfall (inches) [1913-2008]			
	Mean	Highest Month	Lowest Month	Highest Daily
Jan	0.47	2.48	0	1.64
Feb	0.44	3.03	0	1.66
Mar	0.36	2.15	0	1.52
Apr	0.16	3	0	2.67
May	0.02	0.22	0	0.22
Jun	0.02	0.91	0	0.91
Jul	0.24	2.44	0	1.4
Aug	0.64	5.92	0	3
Sep	0.37	2.14	0	1.9
Oct	0.27	1.89	0	1.61
Nov	0.2	1.84	0	1.04
Dec	0.39	3.33	0	1.42
Year	3.59	---	---	3

Notes: (a) Totals may not match the data in specific columns due to rounding errors.
Source: WRCC, 2009.

Soil and Water Table 5
Monthly Average Evapotranspiration (ETo) Rates

Month	CIMIS Station #135	CIMIS Station #151	CIMIS Station #162	CIMIS Station #175	Regional
	Station: Blythe NE	Station: Ripley	Station: Indio	Station: Palo Verde II	
Jan (in/mo)	2.32	2.44	2.44	2.41	2.48
Feb (in/mo)	3.09	3.31	3.31	3.23	3.36
Mar (in/mo)	5.00	5.25	5.25	5.59	5.27
Apr (in/mo)	6.61	6.85	6.85	7.22	6.90
May (in/mo)	8.54	8.67	8.67	8.78	8.68
Jun (in/mo)	9.69	9.57	9.57	9.42	9.60
Jul (in/mo)	10.13	9.64	9.64	9.58	9.61
Aug (in/mo)	8.91	8.67	8.67	8.61	8.68
Sep (in/mo)	6.85	6.85	6.85	6.58	6.90
Oct (in/mo)	4.64	5.00	5.00	4.74	4.96
Nov (in/mo)	2.95	2.95	2.95	2.94	3.00
Dec (in/mo)	2.07	2.20	2.20	2.25	2.17
Year (in/yr)	70.8	71.4	71.4	71.35	71.6

Notes:
CIMIS monitoring station closest to Project site are listed.
Regional evapotranspiration values correspond to CIMS Reference ETo Zone 18, which includes Imperial Valley, Death Valley, and Palo Verde.
Source: AECOM, 2010 and CIMIS, 2010.

Soils

The ground surface in the region of the project generally slopes gently downward to the east-southeast at a gradient of less than 1 percent over most of the site (see the Physiography section above). Steeper grades of 10 to 15 percent are present along the western side of the unnamed mound in Sections 5, 6, and 7, Township 6S Range 22E (CH2MHill 2008). A steeper grade of 50 percent was measured along the southwestern side of an unnamed knob on the northeast side of the McCoy Wash in Section 4, Township 6S Range 22E (CH2MHill 2008).

Because of the high temperatures, low precipitation, and permeable soils, local drainage is intermittent and occurs as dry washes. In areas where topography is flat, soils are very sandy and there are no adjacent uplands to introduce surface runoff, discrete channels have not formed, indicating that most precipitation infiltrates immediately into the ground (CH2MHill 2008).

The National Resource Conservation Service (NRCS) is the leading source for soil surveys that detail soil characteristics of an area. Soil units described by the NRCS are classified as a 2nd Order survey at a scale of 1:20,000 with delineations of 1.5 to 10 acres. Soil survey maps were obtained from the NRCS website (2009); however, approximately 80 percent of the site has not been mapped. The areas of the site that have been mapped include Sections 7 and 18 of Township 6S, Range 22E and Sections 23 and 24 of Township 6S, Range 21E. The majority of the mapped areas are underlain by Chuckawalla very gravelly silt loam but also include Aco gravelly loamy sand, Aco sandy loam, Carrizo gravelly sand, Orita fine sand, Orita gravelly loamy sand, Orita gravelly fine sand loam, Rositas fine sand, and Rositas gravelly loamy sand (NRCS 2009).

Because the majority of soils at the site have not been mapped, a general survey to characterize the soil conditions at the project site was commissioned by the applicant and was conducted in conjunction with the Preliminary Geotechnical Investigation. This soil survey was conducted in the summer of 2009 in conjunction with the preliminary geotechnical investigation (see Preliminary Geotechnical Investigation Report, Application for Certification, Appendix B). General soils data was derived from the United States General Soil Map which is a 4th Order survey (5th Order being the least detailed – scale of 1:250,000 to 1:1,000,000). This data was used in conjunction with observations and laboratory testing conducted during a field reconnaissance to characterize the soils on site. Based on the General Soil Map, there are three map units on the project site: 1) the Rillito-Gunsight map unit, 2) the Vaiva-Quilotosa-Hyder-Cipriano-Cherioni map unit, and 3) the Rositas-Orita-Carrizo-Aco map unit (**Soil and Water Figure 2** and **Soil and Water Figure 3**). The Rillito- Gunsight map unit is the predominant map unit, comprising 43 percent of the project site. It is characterized by sandy loam soils with moderate susceptibility to wind erosion. The Vaiva-Quilotosa-Hyder-Cipriano-Cherioni map unit comprises 32 percent of the project site and is characterized by soils with high percentage (>65 percent) of sand with moderate susceptibility to wind erosion. The Rositas- Orita-Carrizo-Aco map unit comprises 25 percent of the project site and is characterized by soils with high sand percentages and moderate susceptibility to wind erosion. Of these map units, the predominant series officially mapped are the Gunsight in the western one third of the site, the Hyder, Cherioni, and Ciprioni in the central one third of the site, and the Carrizo and Aco in the eastern one third of the site.

There are three mapped soil units beneath the proposed transmission line (T-line) route: 1) the Rillito-Gunsight map unit, 2) the Vaiva-Quilotosa-Hyder-Cipriano-Cherioni map unit, and 3) the Rositas-Dune land-Carsitas map unit (**Soil and Water Figure 4**). Approximately 2.2 miles (11,400 feet) of the northern portion of the T-line are is on the Rillito-Gunsight map unit, 3.4 miles (18,000 feet) of the central portion of the T-line is on the Vaiva-Quilotosa-Hyder-Cipriano-Cherioni map unit, and 1.4 miles (7,500 feet) of the southwestern portion of the T-line is on the Rositas-Dune land-Carsitas map unit. The T-line route was not included as part of the soil survey conducted for the project site as part of the Preliminary Geotechnical Investigation.

Detailed soil descriptions were developed from the Official Series Descriptions (OSDs; NRCS, 2009a). Soil characteristics including depth, texture, drainage, permeability, and erosion hazard of individual soil mapping units are included in **Soil and Water Table 6**. Land capability classification is an indicator of the soils primary limitations for revegetation. Soil types on the project site include VIIe, VIIs, VIIIc, and VIIIs Capability Subclasses, which means the soils have very severe limitations that make them unsuitable for cultivation.

Soil and Water Table 6
Soil Mapping Units and Descriptions

Map Unit	Description
Ac	Aco Gravelly Loamy Sand - Formed in alluvial fan from mixed alluvium - Well drained - Slopes range from 0 -1 percent - Mostly low runoff, sloping areas may have moderate runoff - Moderately rapid permeability - High hazard of wind erosion - Capability Subclass VIIe - Taxonomic Class: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocalcids
Af	Aco Sandy Loam - Formed in alluvial fan from mixed alluvium - Well drained - Slopes range from 0 -1 percent - Mostly low runoff, sloping areas may have moderate runoff - Moderately rapid permeability - High hazard of wind erosion - Capability Subclass VIIe - Taxonomic Class: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocalcids
Ce	Carrizo Gravelly Sand - Formed in arroyos from mixed sandy and gravelly alluvium - Excessively drained - Slopes range from 0 - 2 percent

Map Unit	Description
	- Negligible or very low runoff - Rapid or very rapid permeability - Very low hazard of wind erosion - Capability Subclass VIIIs - Taxonomic Class: Sandy-skeletal, mixed, hyperthermic Typic Torriorthents
Ch	Chuckawalla Very Gravelly Silt Loam - Forms fan remnants derived from mixed alluvium - Well drained - Slopes range from 0 - 1 percent - Moderate runoff - Moderate permeability - Very low hazard of wind erosion - Capability Subclass VIIs - Taxonomic Class: Loamy-skeletal, mixed, hyperthermic Typic Calciargids
Oc	Orita Fine Sand - Forms fan remnants derived from mixed alluvium - Well drained - Slopes range from 0 - 1 percent - Low to moderate runoff - Moderate permeability - Very high hazard of wind erosion - Capability Subclass VIIs - Taxonomic Class: Fine-loamy, mixed, superactive, hyperthermic Typic Haplocalcids
Og	Orita Gravelly Loamy Sand - Forms fan remnants derived from mixed alluvium - Well drained - Slopes range from 0 - 1 percent - Low to moderate runoff - Moderate permeability - High hazard of wind erosion - Capability Subclass VIIs - Taxonomic Class: Fine-loamy, mixed, superactive, hyperthermic Typic Haplocalcids
Or	Orita Gravelly Fine Sandy Loam - Forms fan remnants derived from mixed alluvium - Well drained - Slopes range from 0 - 1 percent - Low to moderate runoff - Moderate permeability - Moderate hazard of wind erosion - Capability Subclass VIIs - Taxonomic Class: Fine-loamy, mixed, superactive, hyperthermic Typic Haplocalcids
RoA	Rositas Fine Sand, 0 to 2 percent Slopes - Forms sand sheets derived from Aeolian sands - Well drained - Slopes range from 0 - 2 percent - Negligible to low runoff - Rapid permeability - High to very high hazard of wind erosion - Capability Subclass VIIs - Taxonomic Class: Mixed, hyperthermic Typic Torripsamments
RsA	Rositas Gravelly Loamy Sand, 0 to 2 percent Slopes - Forms sand sheets on stream terraces, derived from eolian sands over mixed alluvium - Somewhat excessively drained

Map Unit	Description
	- Slopes range from 0 - 2 percent - Negligible to low runoff - Rapid permeability - High to very high hazard of wind erosion - Capability Subclass VIIs - Taxonomic Class: Mixed, hyperthermic Typic Torripsamments
Carrizo	Carrizo Extremely Gravelly Sand, - Formed in mixed alluvium - Excessively drained - Slopes range from 0 to 15 percent - Negligible or very low runoff - Rapid to very rapid permeability - Moderate hazard of wind erosion - Capability Subclass VIIs- Taxonomic Class: Sandy-skeletal, mixed, hyperthermic Typic Torriorthents
Vaiva	Vaiva Series - Gravelly Loam - Formed in slope alluvium from granite and gneiss - Well drained - Slopes range from one to 65 percent - Medium to rapid runoff - Moderate permeability - Taxonomic Class: Loamy-skeletal, mixed, superactive, hyperthermic Lithic Haplargids
Quilotosa	Quilotosa Series – Extremely Gravelly Coarse Sandy Loam - Formed in slope alluvium from granitic and metamorphic rock - Somewhat excessively drained - Slopes range from three to 65 percent - Medium to rapid runoff - Moderately rapid permeability - Low susceptibility to wind erosion - Capability Subclass VIIIc nonirrigated - Taxonomic Class: Loamy-skeletal, mixed, superactive, calcareous, hyperthermic LithicTorriorthents
Hyder	Hyder Series – Extremely Gravelly Sandy Loam - Formed in alluvium from rhyolite and related volcanic rock - Somewhat excessively drained - Slopes range from one to 70 percent - High runoff - Moderate or moderately rapid permeability - Low susceptibility to wind erosion - Capability Subclass VIIIc nonirrigated - Taxonomic Class: Loamy-skeletal, mixed, superactive, calcareous, hyperthermic Lithic Torriorthents
Cipriano	Cipriano Series – Very Gravelly Loam - Formed in fan alluvium from volcanic rock - Somewhat excessively drained - Slopes range from zero to 55 percent - Low to very high runoff - Moderate permeability - Low susceptibility to wind erosion - Capability Subclass VIIIc nonirrigated - Taxonomic Class: Loamy-skeletal, mixed, superactive, hyperthermic, shallow Typic Haplodurids
Cherioni	Cherioni Series – Very Gravelly Fine Sandy Loam - Formed in slope alluvium on volcanic bedrock

Map Unit	Description
	- Somewhat excessively drained - Slopes range from zero to 70 percent - Medium to rapid runoff - Moderate permeability - Low susceptibility to wind erosion - Capability Subclass VIIIc nonirrigated - Taxonomic Class: Loamy-skeletal, mixed, superactive, hyperthermic, shallow Typic Haplodurids
Gunsight	Gunsight Series – Very Gravelly Loam - Formed in alluvium from mixed sources - Somewhat excessively drained - Slopes range from zero to 60 percent - Very low to high runoff - Moderate or moderately rapid permeability - Low susceptibility to wind erosion - Capability Subclass VIIs nonirrigated - Taxonomic Class: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocalcids
Rillito	Rillitoi Series – Very Gravelly Fine Sandy Loam - Formed in mixed alluvium - Somewhat excessively drained - Slopes range from zero to 40 percent - Slow to medium runoff - Moderate permeability - Low susceptibility to wind erosion - Capability Subclass VIIs nonirrigated - Taxonomic Class: Coarse-loamy, mixed, superactive, hyperthermic, Typic Haplocalcids
Carsitas	Carsitas Series – Gravelly Sand - Formed in alluvial fans, moderately steep valley fills and dissected remnants of alluvial fans - Excessively drained - Slopes range from nearly level to strongly sloping - Slow runoff except during rare torrential showers - Rapid permeability - High susceptibility of wind erosion - Capability Subclass VIIe nonirrigated - Taxonomic Class: Mixed, hyperthermic Typic Torripsamments
Dune land	Dune land – Sand - Dunes can be as much as 25 feet high but are generally 10 feet high - Very slow runoff - High hazard of wind erosion - None or slight hazard of water erosion

A historic soils map from 1922 (University of Alabama 2009) shows soils mapped across the entire project site. The soil units shown on this map include (in order of abundance): Superstition sand, Tijeras stony sandy loam, Tijeras sandy loam, Carrizo sand, Superstition gravelly sand, Rough stony land, and Riverwash. No further soil descriptions were provided with the map. With the exception of the Carrizo map unit, the historical soil units described are not consistent with the currently mapped units described as part of the preliminary geotechnical study. Given the date of the historical soils map, it is possible that these map units have been re-characterized.

Site soils were described during a reconnaissance-level geotechnical assessment conducted for the project site (CH2MHill 2008). General observations indicated that the overall soil gradation trended from coarser- to finer-grained alluvial deposits as distance from the McCoy Mountains increased. The ground surface in the western portion of the project site is dominated by areas of desert pavement with layers of flat-lying gravel overlying finer-grained sandy materials. East toward Black Creek road, the surface becomes less dominated by desert pavement and becomes sandier.

The CH2MHill reconnaissance described typical soil types near the western limits of the project site as being expected to range from silty gravel with sand and cobbles to silty sand with gravel and cobbles, depending on the percentage of gravel present in the soils. Typical fines content in these soils would be expected to range from 15 to 35 percent and would likely consist of silt or silty clay (CH2MHill 2008).

Farther east, the gravel content typically decreases, with the exception of some of the larger washes. Typical soil types in the central portion of the project site would be expected to include silty clayey sand, silty sand, and clayey sand depending on the nature of the fines present in the soils. Typical fines content in these soils would be expected to be in the range of 30 to 50 percent and would likely consist of silt, silty clay, or clay (CH2MHill 2008).

Project site soils were also characterized during the field reconnaissance soil survey commissioned by the applicant. Characterization of soils was made through field observations and laboratory testing of samples collected from soil borings. Laboratory textural analysis and field observations characterized the on-site soils as being predominantly gravelly sands. Extensive areas of the project site consist of desert pavement. Soil profiles observed in the test pits were typically sands and laboratory analysis measured sand content from 52 to 85 percent. Fines content measured in the soils ranged from 6 to 30 percent. All observed profiles exhibited a strong to violent effervescence indicating the presences of carbonates. These observations and laboratory analysis results are consistent with the published descriptions for the map units mapped across the project site in the General Soil Map of California.

Geology

Regional & Local Geology

The project is located in the alluvial-filled basin of the Palo Verde Mesa. The geology of this area is shown on **Soil and Water Figure 5**. The basin is bound by the McCoy Mountains to the west, the Little Maria Mountains to the northwest, and the Big Maria Mountains to the northeast. This area has a generally low relief until near the surrounding mountains.

Approximately three miles east of the eastern site boundary, a sharp break in slope forms the boundary between the Palo Verde Mesa and the Palo Verde Valley, which is 80 to 130 feet below the mesa. In the region, the Palo Verde Valley is roughly equivalent to the recent historic floodplain of the Colorado River. Regionally, this valley formed as a result of regional deformation and metamorphism, followed by faulting, local volcanism, and sedimentation during the early Tertiary (CH2MHill 2008). Beginning in Miocene and continuing into the Holocene, alluvial fans formed on the flanks of the surrounding mountains. Alluvial plains occur in the central portion of the valleys along with more recent outwash associated with local drainage. These younger alluvial sediments are generally subdivided based on morphology. Locally, the project site is underlain by Quaternary Alluvium and Jurassic metasediments (CH2MHill 2008).

Surficial deposits of late Miocene to Holocene age form most of the land surface in the area. Most of these deposits are composed of alluvium either derived from local mountain ranges or transported into the area by the Colorado River.

<u>Quaternary Alluvium</u>

Based on the Geologic Map of the West Half of the Blythe 30' x 60' Quadrangle (Stone, 2006) there are six mapped geologic units within the Project limits. Kleinfelder (2009) identified these units and they are listed and described below:

- Alluvium of modern washes (Qw), Holocene, unconsolidated angular to subangular gravel and sand derived from the local mountain ranges.
- Alluvial-fan and Alluvial-valley deposits - Unit 6 (Qa_6), Holocene, generally fine grained deposits that lack desert varnish. These deposits consist primarily of sand, gravelly sand and sandy gravel that show evidence of transport.
- Alluvial-fan and Alluvial-valley deposits - Unit 3 (Qa_3), Holocene and Pleistocene, alluvial fan deposits of gravel and sand that form relatively old dissected surfaces, mostly characterized by smooth, varnished desert pavement. Pavement surfaces are dissected and drained by dendritic networks of sandy channels that vary in depth from less than one meter to several meters.
- Alluvial-fan and Alluvial-valley deposits - Unit 2 (QTa_2), Pleistocene to Miocene, alluvial fan deposits of fine to coarse poorly sorted gravel and sand that typically form high, deeply dissected narrow ridges extending away from the mountain fronts. Some ridge crests form relatively flat narrow plateaus that preserve small tracts of desert pavement.
- Alluvial deposits of the Palo Verde Mesa (Qpv) Pleistocene, unconsolidated to weakly consolidated deposits of sand, gravelly sand, silt, and clay that are well exposed locally along the scarp of the Palo Verde Mesa. These deposits consist of an upper slope forming unit of tan to light gray sandy and gravelly alluvium and a lower cliff forming unit of light reddish brown, interbedded fine grained sand, silt, and clay.
- Alluvial deposits of the McCoy Wash area (QTmw) Pleistocene and/or Pliocene, deposits of rounded river gravel and minor locally derived gravel that form several round hills standing 40 to 80 feet above the Palo Verde Mesa in the vicinity of the McCoy Wash and the southeast side of the McCoy Mountains. Underlain by brown, well consolidated calcareous or gypsiferous sandstone.

Several units composed largely or entirely of alluvium deposited by the Colorado River have been distinguished in the map area. These units are characterized by the presence of light-colored, locally cross-bedded sand and rounded gravel of resistant rock types exotic to the area. Most of these deposits (Qpv) are concentrated along the margins of the modern Colorado River flood plain, where they apparently interfinger with locally derived alluvium. One unit (QTmw), however, crops out high on Palo Verde Mesa as much as 8 km from the flood plain. These high-standing units represent one or more major aggradational events when the ancestral Colorado River flowed across the area at much higher elevations than the modern river (Stone, 2006). Metzger and others (1973) recognized two major pre-Holocene aggradations, one of probable Pliocene-Pleistocene age and the other probably middle to late Pleistocene, each of which was followed by a period of degradation. The last degradation was followed by Holocene aggradation that has deposited the sediments of the modern flood plain (Metzger and others, 1973).

Pliocene Bouse Formation

The Pliocene Bouse Formation underlies the Quaternary sediments. The Bouse Formation includes a marine to brackish-water estuarine sequence deposited in an arm of the proto-Gulf of California (Stone, 2006; Wilson and Owen-Joyce, 1994). This formation has alternatively been interpreted as, or may include, lacustrine sediments deposited in a closed, brackish basin (Stone, 2006). The Bouse Formation is widely reported in the Colorado Valley and tributary basins in southeastern California and descriptions of this formation come from occurrences outside of Palo Verde Mesa. It is reported to be composed of a basal limestone (marl) overlain by interbedded clay, silt, sand, and tufa. The top of the Bouse Formation is relatively flat-lying with a reported dip of approximately 2 degrees south of Cibola (Metzger and others, 1973).

Miocene Fanglomerate

The Bouse Formation is unconformably underlain by a fanglomerate composed chiefly of angular to subrounded and poorly sorted partially to fully cemented pebbles with a sandy matrix (Metzger and others, 1973). The fanglomerate is likely Miocene-age; however, it may in part be Pliocene-age (Metzger and others, 1973). The Fanglomerate represents composite alluvial fans built from the mountains towards the valley and the debris of the fanglomerate likely represents a stage in the wearing-down of the mountains following the pronounced structural activity that produced the basin and range topography in the area (Metzger and others, 1973). Bedding surfaces generally dip from the mountains towards the Colorado River. The fanglomerate reportedly dips between 2 and 17 degrees near the mountains due to structural warping (Metzger and others, 1973). The amount of tilting indicates a general decrease in structural movements since its deposition (Metzger and others, 1973).

Bedrock

Bedrock beneath the project site consists of metamorphic and igneous intrusive rocks of pre-Tertiary age that form the basement complex (DWR, 1963), including Proterozoic schist and gneiss, Paleozoic sedimentary rocks, and Mesozoic sedimentary and metavolcanic rock sequences (Stone, 2006).

Regional Tectonic Setting

The Mojave Desert comprises an area bounded by the seismically active Salton Trough to the west and southwest, and the Garlock Fault to the north. To the east and southeast it is bounded by the Sonoran Desert subprovince, a relatively stable tectonic region located in southeastern California, southwestern Arizona, southern Nevada, and northern Mexico (Balderman, et al., 1978). Palo Verde Mesa is located in the eastern Mojave Desert province in an area that is relatively stable tectonically. Faults in the area occur primarily in Tertiary and pre-Tertiary strata and are related to compressional tectonism along a convergent Andean and island arc margin in the Mesozoic, and extensional detachment and block faulting during Tertiary time. No faults of Quaternary age are known to exist near the Project site.

Local Faulting

The project site lies within the eastern part of Riverside County in a part of California considered not very seismically active. There is little evidence of Quaternary faulting in the map area. The only faults known to cut Quaternary deposits in the area are those that form the northwest-trending Blythe Graben on the southwest side of the Big Maria Mountains (Fugro, Inc., 1975). As described by Purcell and Miller (1980), this graben is about 5.5 km long, 92 m wide, and has about 3 m of vertical relief. The graben cuts alluvial-fan deposits dated as 6 to 31 ka (Purcell and Miller, 1980) and shown as QaG on the map presented here; it appears to be overlapped by younger sediments mapped here as QaL. The tectonic significance of the Blythe Graben is unknown, although it does approximately coincide with a geophysically delineated subsurface fault (Stone, 2006).

Other faults of known or presumed Tertiary age are exposed in most of the mountainous areas surrounding the Project site. In the Big Maria Mountains, a prominent northwest-trending strike-slip fault with about 1.5 km of dextral slip and an arcuate, east-dipping fault with about 1.5 km of normal displacement have been mapped and described by Hamilton (1982, 1984).

In addition to these exposed faults, gravity anomalies (Rotstein and others, 1976; Mariano and others, 1986) suggest the presence of several subsurface faults of presumed Tertiary age in the southern part of the map area. On the basis of the gravity anomalies, northwest-trending faults are inferred beneath Quaternary alluvium on both sides of the McCoy Mountains, along McCoy Wash, and on the southwest sides of the Big Maria and Little Maria Mountains; northeast-trending faults are inferred on the west side of the Mule Mountains and beneath Chuckwalla Valley. The gravity anomalies reflect abrupt changes in basement elevation strongly suggestive of dip-slip fault movements (Rotstein and others, 1976). In addition, some of the faults may have undergone right-lateral strike-slip movement as interpreted by Richard (1993).

Hydrogeology

Groundwater in the area of the Project is contained within Colorado River Hydrologic Region, which covers about 20,000 square miles of southeastern California

(CRBRWQCB 2006). The Colorado River Hydrologic Basin Region is bound to the west by the San Bernardino, San Jacinto and Launa Mountain ranges; to the north by the New York, Providence, Granite, Old Dad, Bristol, Rodman and Ord Mountain ranges and the State of Nevada; to the east by the Colorado River and the State of Arizona; and to the south by the border of the United States and Mexico. The Colorado River Hydrologic Basin Region includes the Salton Sea and the Coachella and Imperial Valleys.

The Colorado River Hydrologic Region is subdivided into 28 groundwater basins, one of which is the PVMGB where the project site is located (**Soil and Water Figure 1**). The PVMGB covers 280 square miles. It is about 25 miles long and has a maximum width of about 15 miles; its axis trends north-south. The Chuckwalla Valley Groundwater Basin, west of the project site, is separated from the PVMGB by the McCoy and Mule Mountains. Separating the two mountain ranges is a gap in the McCoy and Mule Mountains through which U.S. Interstate Highway 10 passes. The PVMGB is bound by the McCoy and Mule Mountains to the west; the Little Maria Mountains, Rice Valley and the Big Maria Mountains to the north; the Palo Verde Valley flood-plain and the Colorado River to the east; and the Palo Verde Mountains to the south. Altitudes on the PVMGB floor range from about 300 feet at the flood-plain boundary to about 1,000 feet at the base of the mountains in the northwestern part of the basin.

There are no significant subsurface structural features that restrict horizontal groundwater flow within the PVMGB according to the California Department of Water Resources (DWR) (1979, 2004a), and the PVMGB is not listed on the DWR list of adjudicated groundwater basins (DWR 2009).

In the PVMGB, groundwater provides a source of water for domestic, industrial, and agricultural water supply. Surface water from the Colorado River, through the Palo Verde Irrigation District (PVID), is the primary source of water for agriculture in the area. In 2007, the PVID supplied about 375,000 af of water for use by agricultural entities within the boundary of their district (U.S. Department of the Interior, Bureau of Reclamation [USBR] 2008) which includes a portion of the PVMGB.

Groundwater Basins

The PVMGB is bounded upgradient by one other groundwater basin that includes the Chuckwalla Valley (DWR Basin No. 7-5) Groundwater basin and downgradient by the Palo Verde Valley (DWR Basin No. 7-38) Groundwater basin. A brief overview of the adjoining basins follows:

Chuckwalla Valley (7-5) - This groundwater basin underlies Chuckwalla Valley in northern Riverside County. The basin is bounded by consolidated rocks of the Chuckwalla, Little Chuckwalla, and Mule Mountains on the south, of the Eagle Mountains on the west, and of the Mule and McCoy Mountains on the east. Rocks of the Coxcomb, Granite, Palen, and Little Maria Mountains bound the valley on the north and extend ridges into the valley. The smaller intervening valleys are contiguous with and tributary to the main part of Chuckwalla Valley (DWR 1963). There are no perennial streams in Chuckwalla Valley. Palen, Ford, and several smaller dry lakes are found in topographic low-points. Average annual precipitation in the basin ranges to 4 inches. (DWR, 2003).

Palo Verde Valley (7-38) - The Palo Verde Valley Basin is located in the southeastern part of California along the state border with Arizona. The eastern boundary of the basin is the Colorado River, which also defines the state border. The Palo Verde Dam and the Big Maria Mountains bound the basin on the north. The Palo Verde Mesa abuts the western boundary and the Palo Verde Mountains bound the southern part of the basin. Surface and groundwater drain to the Colorado River (DWR, 2003).

Groundwater Inflow/Outflow

Natural groundwater recharge to the PVMGB includes recharge from precipitation and subsurface inflow from the Chuckwalla Valley Groundwater Basin to the west (DWR, 2004) and inflow from the Palo Verde Valley Groundwater Basin (PVVGB) to the east. Other sources of recharge to the basin include agricultural return flow.

Recharge from Precipitation

In this part of California, almost all moisture from rain is lost through evaporation or evapotranspiration and runoff occurs principally during intense thunderstorms (CRBRWQCB, 2006). Most recharge from precipitation occurs when runoff from the surrounding mountains exits bedrock canyons and flows across the coarse sediments deposited in the proximal portions of the alluvial fans that border the western edge of PVMGB.

The area of the Palo Verde Mesa watershed encompasses an area of approximately 280,000 acres (**Soil and Water Figure 1**). Methods to estimate runoff proposed by Hely and Peck (1964) were used by AECOM (2010) to estimate mean annual runoff in the PVMGB. Hely and Peck (1964) found that “a large part of the runoff generated by precipitation within the area is absorbed in the alluvium of the valleys and plains” and proposed to estimate runoff based on precipitation data, rainfall-runoff relations and observed characteristics of the terrain. AECOM (2010) reviewed topographic and geological data to divide the PVMGB into localities that approximated the localities as described by Hely and Peck (i.e. mountains, hills, alluvium-steep slope or alluvium-shallow slope). AECOM (2010) calculated the area for each locality. Figure 10 from Hely and Peck (1964) was used to select an average runoff curve number for each locality assuming an average of all soil types which roughly corresponded to a median of the soil type “B” as defined by the U.S. Bureau of Reclamation (USBR). For example, an average runoff number of 74 was selected for alluvium-steep slope. Hely and Peck (1964) developed a relationship between the runoff curve number and the runoff as a percentage of the precipitation (see Hely and Peck [1964] Figure 9). Using this relationship, the annual volume of runoff from each locality was calculated by multiplying the area of each locality times the mean annual precipitation times the percentage of runoff estimated for the runoff curve number. The mean annual precipitation was approximated for each locality by overlaying the mean annual runoff from small tracts information (Plate 3, Hely & Peck, 1964) with the localities identified for the Chuckwalla/Palo Verde basins (see AECOM, 2010).

From the estimated total runoff for the Chuckwalla/Palo Verde basin, simple percentages of 3 to 5 percent were applied to the estimated total volume of rainwater from mean annual precipitation to generate an estimate of total annual infiltration volume (acre-feet) for the basin. **Soil and Water Table 7** presents the estimate of total annual infiltration for the PVMGB.

Metzger et al. (1973) and Owens-Joyce et al. (1987) followed the approach outlined by Hely and Peck (1964) reporting that recharge from runoff through the McCoy Wash was about 800 afy and runoff from the Palo Verde Mountains was 1,200 afy.

Subsurface Inflow

Subsurface inflow from Chuckwalla Valley Groundwater Basin was estimated by Metzger (1973) to be 400 afy. This calculation was based on a cross sectional profile of the boundary between the two basins derived using geophysical methods and regional data regarding groundwater gradients and hydraulic conductivity. Woodward Clyde (1986) revised this estimate based on the results of pump testing at Chuckwalla State Prison and calculated the basin outflow to be 870 afy. Engineering Science (1990) updated this estimate to 1,162 afy, presumably as a result of return flow from prison wastewater disposal; however, the rationale for this adjustment was not provided. Using more recent gravity data, Wilson and Owens-Joyce (1994) found that the area through which discharge occurs is significantly more limited than previously thought due to the presence of a buried bedrock ridge. As a result, the most recent available water budget for the basin has adopted an outflow rate of 400 afy (Eagle Crest, 2009).

Geochemical and water level data supplied by AECOM (2009) suggest that groundwater from outside the basin is flowing into the area as flux from the Colorado River. The USBR in their analysis of the accounting surface has concluded that groundwater below the project site is in communication with the Colorado River. Geochemical data show that there is a gradual mixing of water from the river to the west and into the project site as Total Dissolved Solids (TDS) concentrations progressively increase away from the River (AECOM, 2010).

AECOM developed an estimate of groundwater flux from the Colorado River into the PVMGB using a simple underflow calculation and Darcian flow across a cross sectional area at the upper portion of the basin (see Application for Certification (AFC) Figure 5.17-7 [AECOM, 2009]). The aquifer was assumed to extend a distance of 19,000 feet perpendicular to flow and at a depth of 600 feet below the water table at this location. Using the average transmissivity of 26,000 feet squared per day (ft^2/day) from Leake et al. (2008) and a groundwater gradient of 0.0003 feet per foot (ft/ft) from measurements taken in 2000 (see AECOM [2009] AFC Figure 5.17-7), the groundwater flux across this area was estimated at 1,200 afy.

AECOM (2009) indicated relatively stable groundwater levels over time suggesting very little change in groundwater in storage. In addition, AECOM (2009) suggested that groundwater withdrawal from the underlying aquifer has not significantly changed the water balance within the PVMGB due to recharge of water from the Colorado River. Correspondingly, the project's groundwater withdrawal could induce additional flow from the Colorado River above the existing flux of 1,200 afy estimated above.

Soil and Water Table 7
Estimates of Runoff and Infiltration in Palo Verde Mesa Groundwater Basin

Layer (1)	Area (acres)	Mean Annual Precipitation (inches) (2)	Total Volume of Rainwater from Mean Annual Precipitation (af)	Runoff Curve Classification (2)	Runoff Curve Number (2)	Runoff (percent of Precipitation)	Total Annual Volume of Infiltration – Hely & Peck (af)	Total Annual Volume of Infiltration (af) based on 3 percent (3)	Total Annual Volume of Infiltration (af) based on 5 percent (3)
unit1-pvm	23,695	4	7,898	Alluvium, Steep Slope	74	3.50 percent	276	237	395
bedrockpvm	5,624	4	1,875	Mountains	93	29.10 percent	546	56	94
bedrockpvm	16,819	6	8,409	Mountains	93	29.10 percent	2,447	252	420
bedrockpvm	13,571	4	4,524	Mountains	93	29.10 percent	1,316	136	226
bedrockpvm	18,298	4	6,099	Hills	83	10 percent	610	183	305
unit1-pvm	79,574	5	33,156	Alluvium, Steep Slope	74	3.50 percent	1,160	995	1,658
unit2-pvm	382	4	127	Hills	83	10 percent	13	4	6
unit2-pvm	122,370	4	40,790	Alluvium ,Flat Slope	69	2 percent	816	1,224	2,040
Totals	**280,332**	**---**	**102,878**	**---**	**---**	**---**	**7,184**	**3,086**	**5,144**

Notes:
1. See Figure DR-S&W-179-1 in AECOM, 2010.
2. From Hely & Peck, 1964.
3. Based on a percent of Total Volume of Rainwater from Mean Annual Precipitation (Column 4).

Source: Derived from AECOM, 2010.

Groundwater Demand/Outflow

In 2003, PVID reported that 544 acres within their service area and an estimated 300 acres outside their service area irrigate with groundwater on the mesa (CEC, 2005). Assuming a water usage based on an average evapotranspiration (ETo) value of 71 inches and an irrigation efficiency of 75 percent yields a water use of 7.9 af/acre/yr, this would equate to approximately 6,700 afy of current groundwater demand.

Irrigation Return Flow

As previously indicated, approximately 6,700 afy of groundwater is used for irrigation in the PVMGB. In addition, the PVID supplies water (surface water from its irrigation canal system in the Palo Verde Valley that is pumped up to the top of the Palo Verde Mesa) to the Palo Verde Mesa area. However, based on reviews of aerial photographs, the area supplied is very small. Assuming 1,000 afy is supplied by PVID and the 6,700 afy is pumped, this equates to approximately 7,700 afy of irrigation water supplied in the Palo Verde Mesa area. Assuming 10 percent of the applied water infiltrates and recharges the groundwater basin, an estimated 770 afy recharges the PVMGB from irrigation return flow.

Subsurface Outflow

As previously stated, the PVMGB is in direct connection with Palo Verde Valley Groundwater Basin. It is possible that at the southern end of the PVMGB outflow could occur to the adjacent Palo Verde Valley Groundwater Basin. Since any outflow would be counter-balanced by subsurface inflow on the northern end, the amount of outflow recognized is deemed insignificant.

Groundwater Budget

Soil and Water Table 8, *Estimated Groundwater Budget (AFY),* summarizes the groundwater budget for the Palo Verde Mesa. As previously stated, the significant recharge from the Colorado River underflow is the primary mechanism for recharge to the basin along with infiltration of precipitation (mountain front recharge). To a lesser extent, inflow from the Chuckwalla Groundwater Basin and irrigation return water provide inputs to overall basin recharge.

Soil and Water Table 8
Estimated Groundwater Budget (afy)

Budget Components	Palo Verde Mesa Groundwater Basin
Recharge from Precipitation	3,086
Underflow from Chuckwalla Valley Groundwater Basin	400
Underflow from Colorado River	1,200
Underflow from Palo Verde Valley Groundwater Basin	1,244
Irrigation Return Flow	770
Total Inflow	**6,700**
Groundwater Extraction	6,700
Total Outflow	**6,700**
Budget Balance (Inflow-Outflow)	0

Water Bearing Units

The following water-bearing formations have been identified in the PVMGB. The extent and relationship of these formations is presented in hydrostratigraphic cross sections A-A' included as **Soil and Water Figure 6**. The location of the cross section is shown on **Soil and Water Figure 5**.

Quaternary Alluvium

The youngest major units in the Palo Verde region, the Older Alluvium and Younger Alluvium, were deposited by the Colorado River and are the primary water-bearing units of the local aquifer system (referred to as the groundwater system in this report). The Older and Younger Alluvium were deposited as a series of flood plain deposits. The Older Alluvium is composed of ancestral flood-plain deposits and results from all but the most recent cycle of erosion and deposition by the Colorado River. The Older Alluvium comprises all of the groundwater system deposits of the Palo Verde Mesa and extends beneath the Palo Verde Valley, underlying the Younger Alluvium. The Older Alluvium is much thicker than the Younger Alluvium, reaching thickness of 600 feet beneath the central portion of the valley and the mesa and pinching out along the bordering bedrock mountains. The Older Alluvium is composed of sand, silt, and clay with minor amounts of gravel. The U.S. Geological Survey (USGS) also described the composition and productivity of the Older Alluvium in the mesa. The Older Alluvium includes a narrow zone of highly productive gravel lenses, which occur within a mile from the mesa-valley boundary.

The most-recent erosional episode carved the lowest terrace of the present-day Palo Verde Mesa, as well as a trench in the central portion of these older flood-plain deposits. The Younger Alluvium fills this trench with about 100 feet of sediments and comprises the present-day flood plain deposits of the Palo Verde Valley. The Younger Alluvium is predominately sand and gravel with minor amounts of silt and clay.

Pliocene Bouse Formation

The Pliocene Bouse Formation underlies the Quaternary sediments. The Bouse Formation includes a marine to brackish-water estuarine sequence deposited in an arm of the proto-Gulf of California (Metzger, 1968; Wilson and Owen-Joyce, 1994). This formation has alternatively been interpreted as, or may include, lacustrine sediments deposited in a closed, brackish basin (Stone, 2006). The Bouse Formation is widely reported in the Colorado Valley and tributary basins in southeastern California and descriptions of this formation come from occurrences outside of Chuckwalla Valley. It is reported to be composed of a basal limestone (marl) overlain by interbedded clay, silt, sand, and tufa. The top of the Bouse Formation is relatively flat lying with a reported dip of approximately 2 degrees south of Cibola (Metzger and others, 1973). These unconsolidated to semi-consolidated sediments are reported to yield several hundred gallons per minute (gpm) to wells perforated in coarse grained units (Wilson and Owen-Joyce, 1994).

Miocene Fanglomerate

The Bouse Formation is unconformably underlain by a fanglomerate composed chiefly of angular to subrounded and poorly sorted partially to fully cemented pebbles with a sandy matrix (Metzger and others, 1973). The fanglomerate is likely Miocene-age; however, it may in part be Pliocene-age (Metzger and others, 1973). The Fanglomerate represents composite alluvial fans built from the mountains towards the valley and the debris of the fanglomerate likely represent a stage in the wearing down of the mountains following the pronounced structural activity that produced the basin and range topography in the area (Metzger and others, 1973). Bedding surfaces generally dip from the mountains towards the basin. The fanglomerate reportedly dips between 2 and 17 degrees near the mountains due to structural warping (Metzger and others, 1973). The amount of tilting indicates a general decrease in structural movements since its deposition (Metzger and others, 1973). The presence, depth and thickness of the Fanglomerate beneath the site is unknown but has been reported in the Parker-Blythe-Cibola area by Metzger et al. (1973).

Bedrock

Bedrock beneath the site consists of metamorphic and igneous intrusive rocks of pre-Tertiary age that form the basement complex (Metzger et al. 1973). The bedrock topography in the study area has not been determined but appears to lies at depths exceeding 1,000 feet bgs in Parker Valley approximately 3 miles to the northeast. Metzger et al (1973). Metzger et al. (1973) indicated that it was not a significant source of water.

Groundwater Occurrence and Movement

The depth to groundwater below the project site, measured in October 2009 from newly installed well TW-1, was 195.21 feet below ground surface (bgs) or an elevation of approximately 253 feet msl. In their estimate of groundwater storage, the DWR (1979) used an assumed average saturated thickness of 300 feet and a specific yield of 10 percent for the PVMGB to derive a usable storage of about 5 million af, with about half of the usable storage estimated to be in the McCoy Wash part of the basin. In subsequent reports, the DWR (2004a) listed the groundwater in storage for the basin as “unknown” although they listed the total storage capacity in the basin as approximately 6,840,000 af.

No known barriers or faults inhibit the flow of groundwater in the PVMGB (DWR 1978, 2004a). A small unnamed fault occurs approximately 1.5 miles south of the Project site in the McCoy Mountains (DMG 1967, DWR 1978). As shown on geologic maps of the area (DMG 1967, DWR 1978) this east-west-trending fault has been mapped in the bedrock of the McCoy Mountains and does not appear to extend beneath the sediments filling the valley south of the project.

There are no faults that are considered by the State or County to be active within the site limits. According to Kleinfelder (2009), several inferred faults have been mapped by several authors trending northwest-southeast through the area. These faults are speculative and based on geophysical data (Rostein et al. 1976). The Blythe Graben is mapped approximately 6 miles northeast of the site (Stone 2006). The Blythe Graben offsets Quaternary alluvium dated between 6,000 and 31,000 years old. The tectonic significance of the Blythe Graben is unknown. The location and elevation of alluvial deposits of the McCoy wash area that have been incised by the McCoy Wash and other drainages suggest that tectonic uplift may have affected this area since the Pliocene epoch (within the last 5 million years). This uplift could be related to faulting, or regional uplift associated with the basin and range extension. Because the speculated faults in the area are not considered active, and there is no direct evidence of active faulting on the site, the risk associated with surface rupture from active faults at the site is considered very low.

Several inferred faults have been mapped by some authors trending northwest-southeast through the site (Kleinfelder 2009). The suspected presence of these faults is based on a gravity study (Rostein et al. 1976) and lithologic variations in adjacent mountain ranges (Hamilton 1984). Stone (2006) considered the faults too speculative or imprecisely located to be included on the geologic map referenced in this report. The mapped faults are not considered by the State or County to be active.

Soil and Water Figure 7 presents the water level elevation contours for the PVMGB and Palo Verde Valley Groundwater Basins drawn from year 2000 water level data gathered from the USGS database and the water level measured from the project in October 2009. The contours show that north of the project site, the groundwater flows to the southeast towards the Colorado River, following the general axial trend of McCoy Wash. Beneath the project site and in areas south of the project site, groundwater flow “turns” (in response to influence from the Colorado River) towards the south-southeast following the general flow path of the Colorado River. Based on the 2000 water level data in the USGS and DWR databases (USGS 2009, and DWR 2009) for wells located approximately 2 to 3 miles east of the project site, the hydraulic gradient is about 0.007 ft/ft.

Aquifer Characteristics

In their development of a two-dimensional superposition model for the Parker-Palo Verde-Cibola area, which includes the PVMGB, Leake and others (2008) evaluated published aquifer testing data and through statistical analysis derived a range of transmissivity values from a low value of 6,300 ft^2/d to an average value of 26,200 ft^2/d. They selected a storage coefficient of 0.20 to approximate aquifer conditions throughout their model domain, which includes the Chuckwalla Valley Groundwater Basin and the PVMGB (and the project site).

Metzger and others (1973) provided historical data from pumping tests that were conducted in the 1960s on wells in the PVMGB. They reported transmissivity values ranging from 64,000 to 1,900,000 gallons per day per foot (gpd/ft) of aquifer thickness (or 8,756 to 254,600 ft^2/day), specific yields from 100 to 2,180 gpm/ft of drawdown, and hydraulic conductivities ranging from 210 to 12,300 gallons per day per square foot (gpd/ft^2). The data are summarized in **Soil and Water Table 9**.

Groundwater production from wells completed in the PVMGB averages 1,650 gpm (DWR 1979). The maximum yield reported was 2,750 gpm from well 6S/22E-16A1, which is approximately 6 miles east of the project site. The DWR (1979) indicated that large well yields are common for properly designed and developed wells near the edge of the Palo Verde Valley flood plain, which is east of and adjacent to the PVMGB.

Well yields in the rest of the PVMGB, where sand is the dominant lithology, are lower. Yields greater than 1,000 gpm are reported in wells in the McCoy Wash area. The depth of these wells range from 250 to 600 feet and the wells are 12 to 16 inches in diameter (DWR 1979).

Soil and Water Table 9
Historical Pumping Test Data – Palo Verde Mesa

Well ID	Distance from Project Site	Well Owner or Name	Date of Pump Test	Yield/ Drawdown (gpm/ft)	Depth Interval Tested (ft, bgs)	Trans-missivity (gpd/ft)	Trans-missivity (ft2/day)	Indicated Avg Field Hydraulic Conductivity (gpd/ft2)	Geologic Source Unit
5S/22E-28C2	2.5 mi. NE	U.S. Citrus Corp.	10/25/1962	1,450/?	270-358 382-600	64,000	8,576	210	Older Alluvium of Colorado R.
6S/22E-11H1	3.5 mi. E	H.M. Neighbour	6/18/1964	665/9	165-235	700,000	93,800	10,000	Older Alluvium of Colorado R.
6S/22E-15M1	2.5 mi. E	E. Weeks	6/12/1963	475/21	168-315	500,000	67,000	3,400	Older Alluvium of Colorado R.
6S/22E-32R1	2 mi. S-SE	W. Passey	6/11/1963	650/66	120-123 402-408 479-488	420,000	56,280	NL	Older Alluvium of Colorado R.
6S/22E-35R2	4 mi. S-SE	Southern Counties Gas Co.	10/23/1962	520/15	302-326	150,000	20,100	6,200	Older Alluvium of Colorado R.
6S/23E-24J1	11 mi. E	Clayton Ranch	7/8/1964	2,180/50	NL	1,900,000	254,600	NL	Older Alluvium of Colorado R.
6S/23E-29R1	8 mi. E	City of Blythe 8	10/23/1962	360/33	264-276 354-368	320,000	42,880	12,300	Older Alluvium of Colorado R.
6S/23E-32D1	8 mi. E	City of Blythe 9	10/23/1962	520/31	122-132 168-286	430,000	57,620	3,400	Younger Alluvium – basal gravel
6S/23E-32P1	8 mi. E	City of Blythe 1	10/23/1962	470/12	245-270 290-296	496,000	66,464	10,000	Older Alluvium of Colorado R.
6S/22E-4P1	2 mi. E	J.E. Mason	10/23/1962	100/1.6	NL	1,700,000	227,800	NL	Older Alluvium of Colorado R.

Notes:
NL = Not listed.
Source: Metzger and Others, 1973.

C.9.3.3.5.6 Historic Groundwater Levels and Flow

AECOM (2009) reported that the water level data from 1971 show local variations in water level contours in the area due east of the project, which suggests localized pumping in support of agriculture. Water level data from 2000, show that the water levels had recovered in the area due east of the site, and show a southerly flow of groundwater coincident with the flow in the Colorado River. Groundwater flow in the Basin is from the north, southeast through McCoy Wash at a gradient of 0.001 feet/foot (ft/ft), then south-southwest at gradients of between about 0.0003 and 0.0008 ft/ft in a direction coincident with the flow of the Colorado River (AECOM, 2009).

AECOM (2009) reported that hydrographs (see AECOM, 2009 - Figure 5.17-8) indicate that the water level in the PVMGB has generally remained stable over the recent history. In well Township 4 Range 21 Section 9B1 at the north end of the PVMGB, groundwater elevation remained unchanged from 1971 to 2000. In wells closer to the Project site, groundwater elevations have decreased about 5 feet in well Township 5 Range 22 Section 31E1 from 1966 to 2000 and in well Township 6 Range 22 Section 32R1 from 1947 to 2006. The relatively stable groundwater levels that have been measured over the decades-long period of time suggest that groundwater withdrawal from the underlying aquifer has not significantly changed the water balance within the PVMGB. This is probably in large part due to recharge of water from the Colorado River (AECOM, 2009).

Groundwater Quality

In general, water quality in the PVMGB is generally higher near the edge of the Palo Verde Mesa adjacent to the Colorado River flood plain. The amount of dissolved solids becomes progressively higher away from the Colorado River flood plain and with depth. The groundwater in the area beneath the project site is generally sodium sulfate-chloride in character (AECOM2009).

According to the DWR (1979) report, the TDS content of shallow groundwater in the basin ranges from 730 to 3,100 milligrams per liter (mg/L); however, one deep well in the southwest portion of the basin had a TDS content of 4,500 mg/L. Analyses of water from 11 public supply wells in the PVMGB show that TDS content ranges from 590 to 1,790 mg/L and averages approximately 1,089 mg/L.

Soil and Water Table 10 presents the analytical results for a select number of wells that were sampled between October 1962 and April 1966 located within 0.5 mile and 1.5 mile from the project site. Given the long screen interval for these wells, and the uncertain methodology of sampling the wells, these data likely represent an average water quality of the more permeable sediments over the screen interval. A review of the water quality data for the PVMGB and Palo Verde Valley Groundwater Basin is provided in Table 10 and indicate the following:

- TDS concentrations (466 to 5,640 mg/L) generally exceeded the recommended standard of 500 mg/L, for a drinking water resource in California. TDS concentrations above 1,000 mg/L were reported in water samples from wells due east of the Project site.
- Fluoride concentrations (0.2 to 6.3 mg/L) in some cases exceed the State of California Maximum Contaminant Levels (MCLs) for drinking water (2.0 mg/L). Fluoride concentrations above the MCL are present in water samples from wells on the Mesa due east of the Project site. Concentrations are significantly lower and below the MCL in water samples from wells located in the floodplain (see AECOM, 2009 - Figure 5.17-11).
- Chloride concentrations range from 77.7 to 3,220 mg/L, and in some cases exceed the State of California Secondary MCL for drinking water (250 mg/L). Higher concentrations are found in wells on the Mesa and in the area of McCoy wash northwest of the valley (AECOM, 2009 - Figure 5.17-12).
- Boron concentrations range from 40 micrograms per liter [µg/L] to 2,000 µg/L. In the area of the BSPP most of the water samples collected exceeded the State of California Action Level for drinking water (1,000 µg/L) (see AECOM, 2009 - Figure 5.17-13).
- Sulfate concentrations range from 90 to 1,850 mg/L, and in some cases exceed the State of California Secondary MCLs for drinking water (250 mg/L). The highest concentrations mirror those found for chloride and are located in the area east of the site and in the area of McCoy Wash (see AECOM, 2009 - Figure 5.17-14).

In general, based on available water quality data from the immediate vicinity of the project site, groundwater below the project site would not meet drinking water quality primary or secondary standards for domestic supply without treatment given the elevated levels of TDS and high concentrations of fluoride, chloride, boron, and sulfate. The data show that generally, TDS and sulfate concentrations were generally higher with increasing distance from the Colorado River, with the highest concentrations occurring in the area of the McCoy Wash and the gap between the Palo Verde Mesa and the Chuckwalla Valley Groundwater Basin. Fluoride, chloride, and boron concentrations were generally lower in the eastern portions of the PVMGB (closer to the Colorado River) and increased westward towards the project site. The much higher TDS concentrations below the Mesa reflect recharge of high TDS water to the PVMGB from percolation along the mountain front and underflow from Rice and Chuckwalla Valleys. Inter-mixing of water from these sources and the Colorado River produces the concentration gradient and decline in concentrations in an easterly direction from the project site toward the river (AECOM, 2010).

Soil and Water Table 10
Summary of Groundwater Quality Data (a,b)
(all values reported in mg/L (c) unless otherwise indicated)

Analyte	Test Well (October 2009) (a)	Well 5/22-28C1 (Oct-1962)	Well 5/22-33J1 (Oct-1962)	Well 6/21-36R1 (May 1964)	Well 6/22-17L1 (April 1966)	All Palo Verde Mesa Groundwater Basin Wells (a)
Arsenic	ND<0.01	-- (d)	--	--	--	0.0011
Bicarbonates as HCO3	--	--	--	--	--	20 – 736
Boron	1.41	--	--	1.07	1.4	0.04 – 2.0
Calcium	287	--	--	--	--	9.21 – 844
Carbonates as CO3	--	--	--	--	--	0 – 12
Fluoride	1.3	--	1.7	3	--	0.02 – 6.30
Chloride	370	440	400	420	380	77.7 – 3,220
Iron	0.123	--	--	--	--	0 – 0.4
Magnesium	29.6	--	--	--	--	0.1 – 351
Manganese	ND<0.005	--	--	--	--	0 – 3.9
Nitrate	(N)	ND<0.01	--	--	--	--
Selenium	ND<0.015	--	--	--	--	--
Sodium	457	--	--	--	--	0 – 2,000
Sulfate	970	970	380	440	400	90 – 1,850
Total Alkalinity as CaCO3	34	--	--	--	--	28 – 3,600
Total Dissolved Solids (TDS)	2,170	2,160	--	1,470	1,250	466 – 5,640
pH (units)	--	--	--	--	--	7 – 8.6

Notes:
(a) - Metals data reported from the unfiltered ("total") sample (turbidity at the time of sampling <10NTU).
(b) - Water quality data for all wells adjacent to the Project Site are from available information in online databases and historic reports, a summary of which is provided in Appendix J of the AFC. Source: USGS NWIS water database, 2009.
(c) - mg/L – milligrams per liter
(d) -- no data reported in available online databases or historic documents

Source: AECOM, 2010.

Groundwater Wells in Proximity to the Proposed Project

A total of 581 water supply wells were identified in online databases in the PVMGB (see AECOM, 2010 - Appendix J). A field survey of wells that were within a one-mile radius of the project site was conducted by AECOM (2009) in July 2009 to identify their location, confirm operational status, and estimate their use within the basin. Based on the field survey, no active water supply wells were encountered. Nine out of 13 wells were identified within one mile of the site. All of these wells were used for irrigation supply. Sources of electrical power (i.e., power lines) had been removed from these wells and electrical generators were not observed at any of these wells. With no source of electricity for the water pumps it was presumed that these nine wells were inactive (AECOM, 2009). The remaining four wells were reported to be not accessible, and as such their status could not be determined (AECOM, 2009). Available information for water supply wells located within a one-mile radius of the Project site is summarized on **Soil and Water Table 11**.

Soil and Water Table 11
Characteristics of Nearby Wells

State Well Number	Surface Elevation (ft msl)	Total Depth (ft bgs)	Distance from Proposed Production Well (feet)	Specific Capacity (gpm/ft)
6/21E-25L01	400.2	--	21,000	--
6/22E-08J01	408	302	11,000	35.56-64.80
6/22E-17B01	399.64	302	10,000	25.00-30.60
6/22E-17L01	400	445	11,000	37.88-54.90
6/22E-17L02	397	323	12,000	42.73-56.90
6/22E-18A01	406.88	298	9,000	30.19-35.14
6/22E-18J01	408	302	9,500	32.43-34.62
6/22E-19N02	397	300	16,000	--
6/22E-19N03	397.2	394	16,000	--
6/22E-19R01	395.6	300	16,500	--

Source: Derived from AECOM, 2009 and AECOM, 2010.

Surface Water Hydrology

The project site is located on the alluvial fan sediments derived from the McCoy Mountains, located due west of the project site. The topography slopes gently to the east-southeast at grades of less than 1 percent over most of the site. (see the Physiography section below). Existing topographic conditions show an average slope of about one foot in 80 feet (1.25 percent) toward the east on the west side of the BSPP, and about one foot in 200 feet (0.50 percent) toward the southeast on the east site of the site. Steeper grades of ten to 15 percent are present along the western side of the unnamed mound in Sections 5, 6 and 7, T6S R22E. A steeper grade of 50 percent was measured along the southwestern side of an unnamed knob on the northeast side of the McCoy Wash in Section 4, T6S R22E.

Surface water in Palo Verde Mesa drains to the southeast and towards the Colorado River. At the project site, numerous dry washes occur on the west. These originate on the flanks of the McCoy Mountains and enter the site where they either combine to form a larger dry wash (southwest corner of the site) or disperse as they enter the sandier alluvial plain (on the northern end of the site) [CH2MHill 2008). The McCoy Wash occurs about 2,000 feet from the northeastern corner of the project site trending northwest to southeast and runs between the mound and knob features described above. The McCoy Wash is the largest of the surface water features in the immediate vicinity. Flow in the McCoy Wash can be as high as 4,000 cubic feet per second, as measured in 1976 during historical flooding in the watershed (CH2MHill 2008). There are no permanent bodies of water located on the Project site.

Off-site storm water flows impacting the project site are from a large watershed area to the west and north of the site which covers approximately 10,750 acres (16.8 mi^2). FEMA flood insurance rate maps have not been prepared for the project site or surrounding lands and the project does not lie within a federally mapped floodplain. The upstream extents of the contributing watersheds extend into the McCoy Mountains to the west. The extent of and approximate sub-basin boundaries of the overall watershed impacting the project were delineated utilizing a combination of USGS 7.5 minute quadrangle sheets and site specific aerial topography. The overall watershed boundaries sub-basin delineations, as well as the 100-year peak discharges for each sub-basin are shown on **Soil and Water Figure 9***.* Peak discharges for each sub-basin were calculated using the HEC-HMS model and generally followed the guidelines presented in the *Riverside County Flood Control and Water Conservation District Hydrology Manual,* and are summarized in **Soil and Water Table 12***.*

A comparison was made between the discharge data provided as part of the Drainage Report and discharges obtained using the USGS Regional Regression Equation for the region. The purpose of the comparison was to provide some insight into the reasonableness of the calculated discharges when compared to some other regionally accepted methodology. In general, it appears that the HEC-HMS model and regional regression equations are well correlated, but begin to diverge as sub-basin area increases. The subject area is likely flatter with more dispersed flow than the “average” watershed used in the derivation of the regional regression equation for the area which could account for lower discharges for the larger watersheds. Overall, the reported discharges appear to be reasonable for the purpose of design.

Dry Washes

There are no perennial streams in the McCoy Mountain watershed which impact the BSPP site. The vast majority of the time, the area is dry and devoid of any surface flow anywhere. Water runoff occurs only in response to infrequent intense rain storms. There are numerous moderately defined washes which traverse the site. These features are poorly expressed but are generally discernable on aerial photography. The conveyance capacity of the washes is limited and runoff during moderate to large events would break out of these features and be conveyed across the terrain as shallow sheet flow. In general, the drainages appear to be stable and not experiencing significant downcutting or lateral migration.

Springs, Seeps and Playa Lakes

No springs are listed in the area of the PVMGB where the project site is located, according to the National Water Information System (NWIS) database of Water Resources of the United States that is maintained by the USGS. One spring (McCoy Spring) is shown on a geologic map of the area (DMG, 1967). McCoy Spring is approximately seven miles northwest of the BSPP site and is located in

Pleistocene non-marine sediments just west of the McCoy Mountains. Discharge from McCoy Spring flows west-southwest into Chuckwalla Valley.

Soil and Water Table 12
Summary of Offsite Peak Discharges

Sub-basin ID	Sub-basin Area	Q100 (cfs) (HEC-HMS)	Q100 (cfs) (Regression)*
W1	0.54	1,323	697
W2	0.3	384	459
NW1	0.06	161	147
NW2	0.19	243	332
NW3	0.12	296	240
NW4	0.31	308	470
A2	0.02	29	67
A3	0.02	32	67
A4	0.02	29	67
A5	0.02	27	67
A6	0.02	26	67
A7	0.02	25	67
A8	0.01	24	41
A9	0.01	21	41
A10	0.01	21	41
A11	0.01	20	41
A12	0.01	17	41
A13	0.01	14	41
A14	0.53	315	688
A15	2.74	1,201	2,209
A16	2.83	1,339	2,260
A17	3.22	1,385	2,477
A18	1.26	500	1,273
SW1	0.16	208	294
SW2	1.60	2,398	1,508
SW3	0.96	747	1,049
SW4	0.33	376	492
SW5	0.23	277	380
S1	1.02	723	1,095
S2	0.13	231	254

*The regional regression equation used in the analysis above was taken from the U.S. Geological Survey Water-Resources Investigations Report 94-4002: Nationwide Summary of U.S. Geological Survey regional Regression Equations for Estimating Magnitude and Frequency of Floods for Ungaged Sites, 1993. The equation provided was Q_{100}=1080$A^{0.71}$ *for the* South Lahontan-Colorado Desert Region.

The McCoy Mountains separate the project site from McCoy Spring and thus groundwater extraction from the project site is not expected to affect flow from McCoy Spring. In a report on water wells and springs in Palo Verde Valley (DWR, 1978) and includes the Palo Verde Mesa area, no springs are shown in the McCoy Mountains or the Palo Verde Mesa (AECOM, 2010).

According to the NWIS database, where seeps and surface discharges/outfalls (along with streams, lakes, wetlands, and diversions) are categorized as "surface water sites," three sites are located on the southern edge of the Palo Verde Mesa approximately 10 miles south of the project site. These sites (shown as site numbers. 5, 6, and 7) are listed in **Soil and Water Table 13** and are shown on **Soil and Water Figure 10***.* The northern segment of the Mule Mountains separate these three sites from the project site and groundwater extraction from the Project site is not expected to affect these locations.

Numerous other "surface water sites" (including seeps and surface discharges) are identified in the NWIS database in the Palo Verde Valley Groundwater Basin that is east of and hydraulically downgradient to the PVMGB. As many as 50 "surface water sites" are listed in the NWIS database for the Palo Verde Valley, which includes the floodplain area from the Colorado River westward to the base of the terrace (see AECOM, 2010). Fifteen of the 50 sites are within 10 miles of the project site. The remaining 35 of the 50 sites are 11 or more miles east of the project site – many of these are within a half mile of the Colorado River. The 15 sites that are closest to the project site are listed in **Soil and Water Table 13**. According to the NWIS database, these sites are streams or canals that likely collect irrigation runoff from the abundant farmland in the Palo Verde Valley.

Storm Water Flow

Storm water flow across and adjacent to the project occurs in a network of generally shallow and moderately expressed alluvial channels, and during larger events, as more widespread sheetflow. In general, the channels get shallower and less defined the further the get east from the McCoy Mountains. The applicant provided graphical results of FLO-2D modeling for existing conditions that attempted to present the extents and depths of surface flow across the project during the 100-year event. The methods utilized for the FLO-2D analysis were not provided in Drainage Report or Technical Memorandum. The graphical results of the analysis were difficult to interpret, but did confirm the presence of some more defined drainages as well the occurrence of widespread and shallow sheet flooding across and adjacent to the project. Digital files of the FLO-2D modeling were not provided as requested in during the data request process.

Soil and Water Table 13
Surface Water Discharges in Palo Verde Mesa and Palo Verde Valley within 10 Miles of Project Site

Site No.	Location Number	Location Name	Latitude	Longitude	Type	Distance from BSPP (miles)
1	USGS 334431144121	Rannells Dr at Keim Drive Near Blythe CA	33°34'43	114°41'26	Stream	5
2	USGS 333755114372301	W Side Drain a 10th and Defrain Ave Blythe CA	33°37'55	114°37'23	Stream	7
3	USGS 333940114370801	Up W DSie Drain A 6th Ave near Blythe	33°39'40	114°37'08	Stream	7
4	USGS 332928114443101	Hodges Dr a 30th near Palo Verde CA	33°29'28	114°44'31	Stream	10
5	USGS 09533300	Wellton Mohawk Bypass Dr a AZ Son Bdry AZ	33°29'38	114°48'41	Stream	10
6	USGS 09534550	Two Forty Two Lateral Near San Luis	33°29'13	114°47'14	Stream	10
7	USGS 09534500	E Main Canal Wasteway at AZ Son Bdry	33°29'13	114°47'01	Stream	10
8	USGS 332909114440601	CRDC Near Well 6 CA	33°29'09	114°44'06	Stream	10
9	USGS 332935114433701	Palo Verde Drain A 30th Ave Palo Verde CA	33°29'35	114°43'37	Stream	10
10	USGS 333025114421401	Rannells Dr A 28th Ave Nr Ripley	33°30'25	114°42'14	Stream	9
11	USGS 333123114402300	Westside Dr Palo Verde Outfall, CA	33°31'23	114°40'23	Stream	9
12	USGS 333241114381901	Central CA Dr a 22nd Ave Nr Ripley CA	33°32'41	114°38'19	Stream	8
13	USGS 333426114355801	Lovekin Dr A 18th Nr Blythe CA	33°34'26	114°35'58	Stream	9
14	USGS 333849114354901	W Side Drain A 8th Ave Nr Blythe	33°38'49	114°35'49	Stream	8
15	USGS 333942114353601	W Side Drain A 6th Ave Nr Blythe	33°39'42	114°35'36	Stream	8
Source: Water Resources of the United States National Water Information System (http://wdr.water.usgs.gov/nwisgmap/)						

Source: AECOM, 2010.

Surface and Groundwater Beneficial Uses

The Basin Plan for the CRRWQCB establishes water quality objectives, including narrative and numerical standards that protect the beneficial uses of surface and ground waters in the region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provides comprehensive water quality planning.

Beneficial water uses are of two types – consumptive and non-consumptive. Consumptive uses are those normally associated with people's activities, primarily municipal, industrial and irrigation uses that consume water and cause corresponding reduction and/or depletion of water supply. Non-consumptive uses include swimming, boating, waterskiing, fishing, hydropower generation, and other uses that do not significantly deplete water supplies.

1. Past or Historical Beneficial Uses
    a. Historical beneficial uses of water within the Colorado River Basin Region have largely been associated with irrigated agriculture and mining. Industrial use of water has become increasingly important in the Region, particularly in the agricultural areas.
2. Present Beneficial Uses
    a. Agricultural use is the predominant beneficial use of water in the Colorado River Basin Region, with the major irrigated acreage being located in the Coachella, Imperial and Palo Verde Valleys. The second in quantity of usage is the use of water for municipal and industrial purposes. The third major category of beneficial use, recreational use of surface waters, represents another important segment of the Region's economy.
3. Sources of Drinking Water Policy
    a. All surface and ground waters are considered to be suitable, or potentially suitable, for municipal or domestic water supply with the exception of:
        i. Surface and ground waters where the TDS exceed 3,000 mg/L, and it is not reasonably expected by the Regional Board to supply a public water system, or
        ii. There is contamination, either by natural process or by human activity, that cannot be treated for domestic use using either Management Practices or best economically achievable treatment practices, or
        iii. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

Existing uses of waters from springs in the Colorado River Basin include the Box Spring, Crystal Spring, Old Woman Spring, Cove Spring, Mitchell Caverns Spring, Bonanza Spring, Agua Caliente Spring, Kleinfelter Spring, Von Trigger Spring, Malpais Spring, and Sunflower Spring. Based on a review of available information include the USGS NWIS database, USGS quadrangle maps and data provided by the BLM, none of these springs are within the area that would be influenced by the project. Existing uses of water from springs in the Colorado River Basin include Bousic Spring, Veale Spring, Nett Spring, Gordon Spring, and Arctic Canyon Spring. None of these springs are within the area that would be influenced by the project.

Water quality objectives are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.

1. General Surface Water Objectives (CRRWQCB)
    a. Aesthetic Qualities - All waters shall be free from substance attributable to wastewater of domestic or industrial origin or other discharges which adversely affect beneficial uses not limited to: setting to form objectionable deposits; floating as debris, scum, grease, oil, wax, or other matter that may cause nuisances; and producing objectionable color, odor, taste, or turbidity.
    b. Tainting Substances – Waters shall be free of unnatural materials which individually or in combination produce undesirable flavors in the edible portions of aquatic organisms.
    c. Toxicity – All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in human, plant, animal, or indigenous aquatic life. Compliance with this objective would be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, 96-hour bioassay or bioassays of appropriate duration or other appropriate methods as specified by the CRRWQCB. Effluent limits based upon bioassays of effluent would be prescribed where appropriate, additional numerical receiving water objectives for specific toxicants would be established as sufficient data to become available, and source control of toxic substances would be encouraged. The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or other control water which is consistent with the requirements for “experimental water” as described in Standards Methods for the Examination of Water and Wastewater.
    d. Temperature – temperature shall not be altered.
    e. pH – shall range from 6.0 to 9.0

f. Dissolved Oxygen – shall not be reduced below the following minimum levels at any time: warm – 5.0 mg/L, cold – 8.0 mg/L, and warm and cold – 8.0mg/L

g. Total Dissolved Solids – discharges of wastes or wastewater shall not increase the total dissolved solids content of receiving waters, unless it can be demonstrated to the satisfaction of the Regional Board that such an increase in total dissolved solids does not adversely affect beneficial uses.

h. Bacteria – The geometric mean of the indicated bacterial densities should not exceed one or the other of the following: E. coli – 630 colonies (col) per 100 ml and enterococci – 165 col per 100 ml. Nor shall any sample exceed one other following maximum allowable: E.coli 2000 col per 100 ml and enterococci 500 col per 100 ml.

Any discharge, except from agricultural, shall not cause concentration of total dissolved solids in surface waters to exceed the following limits:

TDS (mg/L)

Location	Annual Average	Maximum
Coachella Valley Drains	2,000	2,500
Palo Verde Valley Drains	2,000	2,500

2. General Groundwater Objectives

Establishment of numerical objectives for groundwater involves complex considerations and it is acknowledged that the quality of groundwater varies significantly throughout the PVMGB and varies with depth. It is the CRBRWQCB's goal to maintain the existing quality of non-degraded groundwater basins and to minimize the quantities of contaminants reaching any groundwater basin.

- Groundwater designated for domestic or municipal supply shall not contain taste or odor producing substances.
- Groundwater designated for domestic or municipal supply shall not contain coliform organisms in excess of limits specified in the regulations.
- Groundwater designated for domestic or municipal supply shall not contain concentration of chemical constituents in excess of the limits specified in the regulations.
- Discharges of water softeners regeneration brines, other mineralized wastes, and toxic wastes to disposal facilities which ultimately discharge in areas where such waste can percolate to ground waters useable for domestic and municipal purposes, are prohibited.

Wastewater reclamation and reuse is encouraged, however, such use must meet applicable water quality standards.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The potential direct effects of the project on local water resources are those associated with using groundwater for construction (specifically for demands during site grading) and with the plant's operational process water demand. No surface water would be used for construction or operation of the project, though project construction and operation may have an effect on the ephemeral washes traversing the site.

Potential impacts on water resources during construction and operation include drawdown and related impacts, depletion of water resources, water quality impacts, erosion, and drainage impacts.

SOIL EROSION

Erosion is the displacement of solids (soil, mud, rock, and other particles) by wind, water, or ice and by downward or down-slope movement in response to gravity. Due to generally flat terrain, the project site is not prone to significant mass wasting (gravity-driven erosion and non-fluvial sediment transport) at present. Soil characteristics at the project site allow for the potential for wind and water erosion, and significant sediment transport currently occurs along McCoy Wash that crosses a portion of the project site.

Environmental impacts associated with the construction and operations are discussed in the following sections. Significance criteria were developed based on California CEQA Guidelines and evaluated using professional judgment. Impacts would be considered significant if:

- Substantially increased wind or water-induced soil erosion occurred as result of Project construction or operation,
- Substantially increased sedimentation occurred in areas adjacent to construction areas,
- Construction activities were to occur in areas of high erosion susceptibility and the disturbed areas were left exposed and not properly stabilized.

Construction and Operation

The solar trough technology that was going to be employed by the Approved BSPP requires extensive grading of the project site. The site would be graded so there would be a less than 1 percent slope downward from the west to the east of the site. Earthwork associated with the Approved BSPP would have included excavation for foundations and underground systems, and the total earth movement that would be needed was approximately 8.3 million cubic yards.

The Modified BSPP would not need the same level of grading because the PV panels are installed on individual supports whose heights can be adjusted to account for varying ground elevations so that the panels are at consistent heights. The fact that the Modified BSPP does not require anywhere close to the grading requirements of the Approved BSPP, the amount of earth work involved would be substantially less than that for the Approved BSPP. Thus the potential for soil erosion during construction of the Modified BSPP would be much less than that for the Approved BSPP.

During construction, the project site, and those portions of the project ROW supporting off-site linear facilities (access road and transmission line corridor) would be disturbed. At that time, the surface of the disturbed areas would be devoid of vegetation and there would be the highest potential for erosion, as well as associated effects including soil loss and increased sediment yields downstream from disturbed areas. With the implementation of mitigation measures Condition of Certification **SOIL&WATER-1**, described below, during construction, impacts associated with soil erosion are anticipated to be less than significant. Earth movement would be balanced on-site; no fill material would be imported or exported. The project is not located on farmland or in areas where agricultural protection legislation is applicable; therefore, there would be no impacts to agricultural soils at the project site.

Wind Erosion

The potential for soil loss by wind erosion was estimated using the Wind Erosion Prediction System (WEPS) for pre-development (undisturbed), during construction, and operational conditions for the approved project. The soils on the project plant site have a low to very high hazard for wind erosion. The results are presented in **Soil and Water Table 14**.

Soil & Water Table 14
Estimate of Soil Loss by Wind Erosion Using Wind Erosion Prediction System (WEPS) Model for the Approved Project

Soil Type	Predicted Soil Loss (tons per acre per year)		
	Undisturbed Conditions	Disturbed Conditions (Construction)	Operational Conditions
Gunsight Series	88	71	38
Cipriano Series	101	81	49
Aco Series	539	553	296

Source: AECOM, 2009.

The wind erosion values calculated for the site indicate that during construction, only the Aco Series type soils would exceed undisturbed conditions. Large areas of the site consist of desert pavement that has formed from previous removal of fine particles through wind erosion. The resulting desert pavement is resistant to further wind erosion. If this protective layer is disturbed, the underlying layer of Aeolian material is subject to high levels of wind erosion, comparable to the Aco

Series. The Aco Series on the eastern third of the site has the highest erosion rates for undisturbed, disturbed, and operational conditions and may be considered a potentially significant impact from the project.

The runoff designations for the soils affected during site grading are negligible to low for the Rositas fine sand and Rositas gravelly loamy sand, low to moderate for the all other soil units mapped by the NRCS. In contrast the Carrizo and Rositas soil series have rapid to very rapid permeability whereas the Aco, Chuckawalla, and Orita soil series have moderate permeability. Permeability for soil throughout the site ranges from low to very high. Because of the climatic conditions, potential for precipitation, and storm water runoff that historically does not reach the valley from surrounding mountains, infiltration at the site is expected to be moderate to rapid.

The applicant has not revised the calculations for the Modified BSPP. However, since soil disturbance during construction of the Modified BSPP would be substantially less than for the Approved BSPP, wind erosion during construction is expected to be much less than what is presented in **Soil and Water Table 14** above. Under operational conditions, even though the amount of grading for the Approved BSPP was going to be much larger than the Modified BSPP, the fact that soil stabilizers were going to be used for the Approved BSPP to control wind erosion of soil, it is expected that wind erosion for both the Approved BSPP and Modified BSPP would be similar.

Water Erosion

The potential for soil loss by water erosion (sheet and rill erosion) was estimated for the Approved Project using the Universal Soil Loss Equation (USLE) for pre-development, during construction, and operational conditions. The USLE model was used to calculate soil loss due to water erosion and are provided in **Soil and Water Table 15**.

Soil and Water Table 15
Approved Project Estimate of Soil Loss by Water Erosion Using Universal Soil Loss Equation (USLE)[a]

Soil Type	Predicted Soil Loss (tons per acre per year)		
	Undisturbed Conditions	Disturbed Conditions (Construction)	Operational Conditions
Gunsight Series	0.42	0.92	0.84
Cipriano Series	1.16	4.63	1.46
Aco Series	0.23	0.51	0.23

Source: AECOM, 2009.

Water erosion from sheet and rill erosion under the present undisturbed conditions can be considered negligible except for wash areas in the central portion of the site where soils are potentially more erosive due to higher silt content. High infiltration rates, flat slopes, and low rainfall contribute to the low water erosion rates. Soils in the central third of the project site contain soils more susceptible to water erosion. When soils are disturbed during construction erosion rates may increase slightly which may pose a potential impact. However, during construction, the bulk density of soils would increase due to compaction from heavy equipment. Compaction of the soil would decrease soil infiltration rates potentially causing greater runoff, especially during high intensity, short duration rainfall events.

The applicant has not revised the calculations for the Modified BSPP. However, since soil disturbance during construction of the Modified BSPP would be substantially less than for the Approved BSPP, water erosion during construction would be expected to be much less than what is presented in **Soil and Water Table 15** above. Under operational conditions, the Approved BSPP was going to use diversion channels that would redirect off-site flows away from the project site, thereby limiting the potential for water erosion of the project site. The Modified BSPP would not redirect off-site flows and would maintain flow through conditions similar to pre-project conditions. Thus water erosion from the Modified BSPP would be expected to be greater than the Approved BSPP, but close to pre-project conditions.

Grading and excavation for the Modified BSPP would result in disturbance of several areas, thereby causing them to be susceptible to potential erosion. After project completion, the temporary parking and construction laydown areas would be restored and a relatively small area would become impervious due to the addition of concrete foundations and asphalt paving. The balance of the previously disturbed area would be susceptible to potential erosion during the operational life of the proposed project. Furthermore, the addition of impervious surfaces to an area previously undeveloped has the potential to result in an increase in velocities of storm water runoff, which would increase the erosion potential of open soil areas.

The project owner submitted a Preliminary Draft Drainage Erosion and Sedimentation Control Plan (DESCP)/Storm Water Pollution Prevention Plan (SWPPP) (NEBS 2013e) that states permanent erosion control measures would reduce potential soil related impacts, including gravel, and landscaping. These would be stabilized areas with very little or essentially no risk of erosion. In addition, relatively small rock filters and local diversion berms through the solar panel fields may be installed as required to discourage water from concentrating and to maintain sheet flow. These all would serve to prevent wind and water erosion and maintain some water infiltration capacity of the soil.

Implementation and maintenance of permanent Best Management Practices (BMPs) during operations would reduce or avoid impacts to onsite soil from erosion. Staff finds the Preliminary Draft DESCP to be reasonable in concept. However it does not sufficiently discuss post construction measures for erosion and sediment control. The document should address exposed soil treatments proposed during operation of the project for both road and non-road surfaces, as described in item H of Condition of Certification **SOIL&WATER-1**. A maintenance schedule should include post construction maintenance of BMPs applied to disturbed areas following construction. Staff believes that compliance with Condition of Certification **SOIL&WATER-1** which would require the project owner to develop and implement an approved DESCP would reduce the impacts of soil erosion during operation of the proposed project.

Although modeling and calculations can be used to estimate post-construction flows and provide a basis for structural design parameters, alluvial flows are very complex. Flood flows from the mountains are initially confined in incised channels, but at the site the flood flows are broadly distributed (known as sheet flow) and less confined and can take random paths across the fan. Predicted flow depths and velocities have a potential uncertainty because they do not account for the dynamics of erosion and sedimentation which carry and deposit sediments at various locations along the margin of the alluvial fan where the site is located. Where obstructions such as solar panel posts and fences are encountered, flows can have erosive effects which could undermine their stability. The consequences of flash flood damage or modified sedimentation and erosion rates may be significant. The project owner needs to make sure local scour around solar panel supports is kept to a minimum so that the stability of the supports would not be compromised, and also to ensure that drainage courses are free of debris to maintain their capacity. Staff believes that compliance with proposed Condition of Certification **SOIL&WATER-19** would keep impacts to below a level of significance**.**

Mitigation

With Implementation of Condition of Certification **SOIL&WATER-1**, described in detail in the **Proposed Conditions of Certification** section below, construction and operation of the project is not expected to result in significant impacts related to water erosion of soils would further reduce the potential for impacts to soils related to water erosion. Also potential increase in erosion in the solar panel field and especially within the dry washes would be mitigated with the implementation of Condition of Certification **SOIL&WATER-19** requiring a Storm Water Damage Monitoring and Response Plan to reduce these potential impacts.

Groundwater Basin Balance

There is concern that the amount of groundwater used for both construction and operations would place the groundwater basin into overdraft. Groundwater overdraft is “the condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average conditions.” (CDWR, 1998).

For purposes of impact analysis, it is assumed that any withdrawals that exceed the average natural recharge and exceeds a significant percentage of the total amount of groundwater in storage would be a significant impact. The following discussion presents an analysis of the potential for overdraft and significant depletion of groundwater in storage to occur.

Construction and Operation

The Modified BSPP has proposed to utilize underlying groundwater to supply project water needs during construction. There is a concern that the water demand of the project could exceed the groundwater basin budget and lead to overdraft conditions.

As previously indicated, the PVMGB lies in an area that is influenced by the Colorado River system. Currently, the PVMGB is in balance whereby inflow (approximately 6,700 afy) to the basin equals outflows. Approximately 1,200 afy is attributed to subsurface inflow from the adjacent Palo Verde Valley Groundwater Basin and 1,200 afy is attributed to underflow from the Colorado River.

It is not anticipated that groundwater extraction during construction (~300 afy) and operation (40 afy) would exceed the subsurface inflow and place the basin into overdraft conditions. Total groundwater expected to be extracted from the PVMGB by the project from construction through operation is approximately 2,400 af. The Palo Verde Mesa Groundwater basin has approximately 5,000,000 acre-feet in storage. The total amount extracted equates to approximately 0.05 percent of the available water in storage. Impacts to basin groundwater storage are considered to be insignificant. However, the project’s pumping could have an effect on the Colorado River by inducing flow into the Palo Verde Mesa and as such those effects could be significant.

The applicant did not provide an analysis of the proportion of water originating from storage, from natural recharge and/or the Colorado River underflow. However, water in the Colorado River is fully appropriated and according to U.S.

Supreme Court (2006) Decree (State of Arizona v. State of California); the decree indicated that “Consumptive use from the mainstream within a State shall include all consumptive uses of water of the mainstream, including water drawn from the mainstream by underground pumping.” The mainstream was indicated as “the mainstream of the Colorado River downstream from Lee Ferry within the United States, including the reservoirs thereon.” The Supreme Court Decree went on to state that the State of California is enjoined “from diverting or purporting to authorize the diversion of water from the mainstream the diversion of which has not been authorized by the United States for use in the respective States; provided, however, that no party named in this Article and no other user of water in said States shall divert or purport to authorize the diversion of water from the mainstream the diversion of which has not been authorized by the United States for its particular use.”

The U.S. Geological Survey has indicated that the PVMGB lies within a basin tributary to the Colorado River and wells drawing groundwater might be considered withdrawing water from the Colorado River (Wilson et al., 1994). Depending on the flow regime that would result from the project pumping, all or a portion of the groundwater production at the site could be considered Colorado River water. Consequently, the project has the potential to divert Colorado River water. Use of Colorado River water must meet requirements of the United States Bureau of Reclamation (USBR). In 2008, USBR proposed a rule that specified a method to determine whether any particular well is drawing water from the river aquifer, thus requiring an entitlement from USBR. The proposed rule was later withdrawn by USBR with no anticipated date of being promulgated[1].

The project owner has been give the option to mitigate for all the water pumped by the project or implement **SOIL&WATER-16** Condition of Certification specified in the **Proposed Conditions of Certification** section below to refine the quantity of water contributed by the Colorado River from project groundwater extraction. This analysis may also be used to estimate the volume of water that must be replaced in accordance with Condition of Certification **SOIL&WATER-2**..

Implementation of the Condition of Certification specified in the **Proposed Conditions of Certification** section below is anticipated to reduce the potential for impacts to water drawn from the Colorado River through groundwater pumping to below the level of significance.

Mitigation

There is a potential that groundwater production at the Project site may induce additional inflow from the Colorado River which would be a significant impact. Implementation of the Condition of Certification **SOIL&WATER-2** specified in the Proposed Conditions of Certification Section below is anticipated to reduce the

[1] See the discussion of the California Water Code, Section 1200 “Water Rights” under Compliance with LORS and State Policies, below.

potential for impacts to the Colorado River below the level of significance. The project owner could choose to conduct the analysis described in **SOIL&WATER-16** Condition of Certification specified in the **Proposed Conditions of Certification** section below to refine the quantity of water contributed by the Colorado River from project groundwater extraction.

Groundwater Levels

The project has the potential to lower groundwater levels as a result of water production during both construction and operations. The lowering of groundwater levels could have a significant impact if the lowering of the groundwater levels: 1) impacts existing water wells in the basin; 2) impacts existing springs, seeps or other surface water discharges, and/or 3) lowers the water table in areas where deep-rooted phreatophytes are prevalent.

Drawdown imposed by a well on another nearby pumping well can have adverse affects on the performance of that well and is referred to as interference drawdown or well interference. Specific potential adverse affects evaluated in this study include the following:

1. Interference drawdown can result in the water level of an aquifer being drawn down below the screen of the well (*i.e.*, the well goes dry);
2. Interference drawdown can result in the water level of an aquifer being drawn down to a point where the affected well's capacity to pump water is decreased and the well can no longer produce the amount of water that is needed for a particular use, or the well is at risk of becoming damaged and unusable over time due to exposure of the well's screen above the water table and resulting corrosion;
3. Interference drawdown can result in the water level in the affected well being drawn down to near the intake of the well's pump, requiring lowering of the pump intake in order for the well to remain operational; and/or
4. Interference drawdown can cause a decrease in groundwater level in the affected well such that the well and pump can continue to operate and produce adequate amounts of water, but pumping must occur at either greater frequency or duration, and/or water must be lifted to a greater height, resulting in greater operational (including energy) and maintenance costs.

The extent and type of well interference experienced by an affected well is dependent on hydrogeologic conditions in the aquifer as well as the characteristics of the affected well. These include the following:

- The amount of interference drawdown that is applied (which varies with the distance of the impacted well from the project well(s);
- The depth and screened interval of the affected well;
- The thickness of saturated sediments penetrated by the affected well;

- Local variations in the transmissivity of the saturated sediments in which the affected well is completed, if any;
- The condition and efficiency of the affected well;
- The affected well's pump specifications, including its rating curve, the depth at which the pump intake is set, and the resulting pumping water level in the well during operation; and
- The minimum required water production rate of the well.

Construction and Operation

Water supply for the Modified BSPP would be pumped from the groundwater aquifer beneath the project site. Construction phase water needs would be about 1,200 AF (average of 300 AFY for 48 months), while operational needs would be up to 40 AFY. Compared to 4,100 AF for the construction phase and 600 AFY for the operation of the Approved BSPP, the impact of water extraction for the Modified BSPP would be much less than the impacts of the Approved BSPP. A groundwater impacts assessment for the Approved BSPP was performed using a numerical model that uses aquifer properties and boundary conditions as well as pumping stresses applied to the aquifer.

AECOM (2010) used a numerical groundwater model developed by the USGS (Leake et al., 2008) to evaluate potential impacts from Approved BSPP pumping. The basis for use of the model included that:

- The model included the project site and was of sufficient detail and complexity to adequately evaluate impacts from the modest pumping proposed for the project.
- It had undergone review by the USGS and USBR. As such, the model had undergone significant peer review prior to being published.

The regional model used by AECOM (2010) is a two-dimensional superposition model developed using MODFLOW code (Harbaugh, 2000) for the Parker-Palo Verde-Cibola area, which includes the PVMGB and the project site. The model employed a simple vertical geometry and a large grid spacing to evaluate the impacts from groundwater pumping on the Colorado River. Major features of the model include:

- Two dimensional and uniform 0.25 mile grid spacing.
- Two statistically derived low and average transmissivity values (6,300 feet squared per day [(ft^2/d)] and 26,000 ft^2/d) for a conservative and an average values.
- A constant storage coefficient or specific yield (0.2).
- A uniform saturated thickness of the aquifer (500 feet).

The existing USGS model was customized by AECOM (2010) to the extent practical using the site specific data from an aquifer test conducted during onsite investigations. The area of the impact zone from the pumping well was determined based on results from sensitivity model runs. The entire model domain was divided into two zones: one that represented the well impact area and the other that represented the remainder of the model area. For Zone 1, both site specific and existing hydraulic parameters were used for simulations; for Zone 2, however, only existing hydraulic parameters were used because there are no additional data available at the time of this investigation.

The USGS model (Leake et al., 2008) employed to evaluate impacts in the August 2009 AFC assumes a homogeneous aquifer in which aquifer parameters (i.e., transmissivity and specific yield) are uniformly applied across the model domain. In the evaluation conducted in the AFC, the model was used to conduct an analysis of the potential impacts from proposed groundwater pumping to supply water for the Approved BSPP. At the time, no site specific aquifer data were available, so the aquifer property values determined by USGS were used across the model domain.

Subsequent to the submission of the AFC, additional site investigation was conducted and a pumping test completed on the Project site by the proponent (AECOM 2010). In addition, additional information was provided through the BLM on the proposed projects within the PVMGB such that the cumulative impacts assessment provided in the AFC could be refined using the numerical groundwater model. To reflect these additional data, the USGS model was updated in response to the data requests providing:

- An update to project-only pumping impacts using site specific and regional aquifer characteristics;
- An update to an assessment of cumulative impacts from other proposed projects within the Chuckwalla Valley Groundwater Basin using recent information provided by BLM on proposed water supply and ;
- A sensitivity analysis expanding beyond what was provided in the AFC to include additional transient simulations varying the transmissivity and storativity.

The aquifer test used a former water supply well onsite and two observation wells to assess aquifer characteristics below the project site. The values from the testing tended to be well within the range of prior values reported by others and those used by the USGS (Leake et al., 2008). The transmissivity values were estimated to be between 10,000 ft^2/d and 28,000 ft^2/d. Some of the storage estimates were within the range reported by Leake et al. (2008), though some were well outside the range used by the USGS in their model (0.05 to 0.2). The variation in some of the estimates could be a function of the partial penetration of the observation wells and variation beyond some of the bounding assumptions for application of the equations to estimate storage.

To incorporate the aquifer testing data, the model domain was portioned into zones, with the zone incorporating the pumping well inclusive of the range of aquifer characteristics from the testing and the zone outside this area incorporating those transmissivity and storage values used by the USGS in their modeling. The Zone 1 area is delineated based on the most conservative radius of influence obtained from sensitivity analysis. In doing so, the more conservative impact can be assessed. For example, in the analysis conducted for the AFC, the lowest transmissivity value (i.e., 10,000 ft^2/d) applied near the project site test well is identical with the other areas of the model domain. Using the aquifer testing data in this update, two of three additional simulations were conducted using lower transmissivity value from the recent aquifer test (i.e.,10,000 ft^2/d) around the well. The zone established using the lower transmissivity value to the distance of a drawdown of one foot was used to set the extent of Zone 1 in all model runs.

Zone 1 is bounded by an area that centers at the project well with a radius of about 26,000 feet, the large radius of influence at 1-foot drawdown from the sensitivity analysis (see **Soil and Water Table 16**, *Results of Numerical Modeling for Proposed Project*, Model Runs 17 through 19, below).

Soil and Water Table 16
Results of Numerical Modeling for Approved Project

Model Scenario	Objective	Zone 1		Zone 2		Year (a)	Maximum Draw-down (feet) (b)	Distance (in feet) from Production Well Field to 1-foot Contour (c)	Distance (in feet) from Production Well Field to 5-ft Contour (c)	Storage Change (af)	Storage Change (percent of Recover-able) (d)
		Trans-missivity (ft^2/d)	Storativity (unitless)	Trans-missivity (ft^2/d)	Storativity (unitless)						
Run 1	Project only impacts assessment using only the single well on the Project site.	10,000	0.2	6,300	0.2	2015 2029 2043	7.9 4.4 5.2	10,000 --- 20,000-24,000	<2,500 --- <2,500	5,000 13,400 22,200	0.10 percent 0.30 percent 0.49 percent
Run 2	Project only impacts assessment using only the single well on the Project site.	28,000	0.2	26,000	0.2	2015 2029 2043	3.3 1.7 1.9	~6,000 --- 14,000-20,000	0 0 0	5,000 12,600 19,500	0.11 percent 0.28 percent 0.43 percent
Run 17	Determines relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	28,000	0.02			2015 2029 2043	7.08 4.82 4.91	42,839 69,295 69,295	95 0 0	3,100 5,200 6,300	0.06 percent 0.10 percent 0.13 percent
Run 18	Determines relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	28,000	0.2			2015 2029 2043	5.83 3.83 4.02	5,005 7,227 18,424	15 0 0	3,900 11,500 17,700	0.08 percent 0.23 percent 0.35 percent
Run 19	Determine relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	10,000	0.2			2015 2029 2043	15.19 9.83 10.24	8,133 21,234 26,136	903 408 595	4,000 12,300 20,200	0.08 percent 0.25 percent 0.40 percent

Notes:
(a) - POD assumes 69 month (5.75 years) construction period with total water usage during construction to be 4,100 af and 600 afy usage during operational phase. Construction water usage averaged over a period of 5 years starting in 2011 (proposed construction start is 4th quarter 2011). Year 2029 represents 14 years into operation. Year 2043 represents the end of operational life of the Project.
(b) – Three wells are proposed to supply water needs during construction and four wells (up to a maximum of 10 wells) during operations. The value represents the maximum drawdown observed at any one well.
(c) – See Appendix E – Numerical Groundwater Modeling: Assessment of Impacts from a revision in the well configuration for the proposed construction water supply.
(d) - The storage change is based on a recoverable storage of 5,000,000 acre-feet as reported by the DWR (2004)

Source: Derived from AECOM, 2010.

The modeling results for the Approved BSPP, which was planning to pump about ten times the amount that would be pumped by the Modified BSPP suggest that during the life of the Approved BSPP, groundwater level declines of five feet or more would be located at a distance of less than 1,100 feet from the proposed production well. The closest existing well is located at a distance of 9,000 feet. Consequently, the potential impact to water levels in existing wells appears to be insignificant.

As was mentioned above, the modeling results above correspond to the construction and operation pumping of the Approved BSPP. As noted above, since the water needs for the modified project are substantially less than the Approved BSPP needs, the impact on groundwater drawdown should be proportionately smaller.

Mitigation

Groundwater levels near the project's water supply wells would decline during the project pumping. Local decline of groundwater levels within the cone of depression could affect nearby wells. While preliminary studies and calculations have been made to assess the potential for impact, the quantification of the impact is considered an estimation and would not be able to be accurately quantified until actual long-term groundwater production occurs. Condition of Certification **SOIL&WATER-3** through **SOIL&WATER-5**, provided in the **Proposed Conditions of Certification** section below, are expected to minimize impacts to groundwater levels below the level of significance.

Groundwater Quality

Construction

There is a potential that significant groundwater quality impacts could occur during construction if contaminated or hazardous materials used during construction were to be released and migrate to the groundwater table. Given the distance to the groundwater table (195 feet bgs) and the proposed implementation of a hazardous material management plan during construction (see Section C.5), potential impacts to groundwater quality are expected to be maintained below the level of significance. Furthermore, construction of groundwater wells could impact the water quality in the underlying aquifer if harmful substances used in the well drilling and construction reach the groundwater underneath. To protect the safety of water users, operation of the water wells would have to be in accordance with both state and county regulations as specified in the staff proposed Condition of Certification **SOIL&WATER-3**.

Operation

The Modified BSPP would have two 6-acre double-lined evaporation ponds for discharge of reject water from the RO treatment system. The ponds will be designed and permitted as Class II Surface Impoundments in accordance with

CRBWQCB requirements, as well as the requirements of the California Integrated Waste Management Board (CIWMB). Two ponds are planned to allow plant operations to continue in the event that a pond needs to be taken out of service for some reason, *e.g.,* needed maintenance. Each pond will have enough surface area so the evaporation rate exceeds the input rate at maximum design conditions and annual average conditions.

The average pond depth is five feet and residual precipitated solids will be removed every 8 to 10 years over the 30 year life of the project. The precipitated solids will be sampled and analyzed to meet the characterization requirements of the receiving disposal facility. The characteristics of the precipitated solids will determine the transportation and disposal methodology. It is anticipated the pond solids and other non-hazardous wastes would be classified as Class II Designated Waste, a non-hazardous industrial waste. NextEra Blythe Solar will test the pond solids using appropriate test methods in advance of removal from the evaporation ponds to confirm this determination. A total estimated amount of solids accumulated by the Approved BSPP was 23,000 tons over 30 years. Given the substantial reduction in the amount of groundwater to be treated by the Modified BSPP compared to the approved project (40 afy vs. 600 afy), the total estimated amount of solids is expected to be proportionately smaller.

The pond liner system will consist of a 60 mil high density polyethylene (HDPE) primary liner and a secondary 40 mil HDPE liner. Between the liners is a synthetic drainage geonet and collection piping that is used as part of the leachate detection system, which will be directed back to the pond. There will be a hard surface protective layer on top of the 60 mil HPDE which will consist of a hard surface such as roller-compacted concrete. The hard surface provides protection against accidental damage to the HDPE from falling objects, varying climatic conditions, and worker activities during cleanout and maintenance. Monitoring of the evaporation ponds will be required to detect the presence of liquid and/or constituents of concern. It is expected the constituents of concern for this monitoring will include chloride, sodium, sulfate, TDS, biphenyl, diphenyl oxide, potassium, selenium, and phosphate. Due to the aforementioned construction and operational procedures of the surface impoundments along with Condition of Certification **SOIL&WATER-7**, groundwater quality is not anticipated to be affected as a result of disposal of this waste stream and impacts to groundwater quality would be below the level of significance. Condition of Certification **SOIL &WATER-7** has been revised to remove the requirements for the LTUs as these would not be used by the Modified BSPP.

Since the Modified BSPP would not use a HTF for its operations, there would no longer be a need to build the LTUs that were planned for the Approved BSPP. Therefore, the requirements for the operation of the LTUs have been deleted from Condition of Certification **SOIL&WATER-7**.

The use and application of septic fields is a long established practice as a method of wastewater treatment. The closest septic field is in excess of one-half mile. The septic systems would have no effect on the surface water in or around the project site. The septic systems would be installed approximately 5 to 6 feet deep and these type systems result in wastewater constituents being non-detectable within three feet of the bottom of the leach field. In addition, the Riverside County Department of Environmental Health has a Technical Guidance manual for Onsite Wastewater Treatment Systems and this requires a setback of 100 feet between this type of system and the nearest groundwater well. There is no groundwater well within this distance and the nearest property is in excess of one-half mile away.

A septic system and leach field are planned for the project's maintenance facility. The septic system and leach field for the operation and maintenance facility are hydraulically cross gradient from the southernmost privately owned parcel. Therefore, operation of the septic system and leach field is not expected to impact surface and groundwater quality at the privately-owned parcel where (according to USGS topographic map), a well may exist (this well was not listed on USGS or DWR databases of wells).

The septic system and leach field for the project would be constructed in accordance with the requirements of Riverside County and Condition of Certification **SOIL&WATER-8**:

1. Ordinance 650.5 (the Riverside County that amends Ordinance 650 that regulates the discharge of sewage in unincorporated areas of the County of Riverside and incorporates by reference Ordinance 725);
2. Title 15 Section 15.24.010 (the Uniform Plumbing Code) Appendix K for Private Sewage Disposal – General and Disposal Fields; and
3. Title 8 Section 8.124.030 (Approval and Construction Permit for Sewage Discharge) and Section 8.124.050 (Operation Permit for Sewage Disposal).

Soil and Water Table 17 below lists septic system and leach field minimum setbacks as required by the County of Riverside and the project setbacks for the BSPP site.

Mitigation

Groundwater quality in the vicinity of the project site could be impacted as a result of the operation of the surface evaporation impoundments and septic fields. Preliminary studies and calculations have been made to assess the potential for impact. These studies suggest that there is a low potential to impact groundwater quality in the vicinity of the project site. Due to the uncertainty associated with the potential to impact groundwater quality and the regulatory requirements for operation of the surface evaporation impoundments as well as stormwater and potentially septic system operations, staff recommends implementation of specific monitoring and mitigation requirements.

Soil and Water Table 17
Sanitary Facility Set-Back Requirements

County of Riverside Requirement	Minimum Set Back	Project Set Back	Reference
Minimum Distance Between Groundwater and Leach Lines	5 feet	175 feet	Riverside County Ordinance 650.5 (& OWTS Guidance Manual)
Minimum Horizontal Distance From Water Supply Wells	50 feet	250 feet	2007 California Plumbing Code (adopted by Reference as Riverside County Title 15, Chapter 15)

Source: AECOM, 2010.

Implementation of Condition of Certification **SOIL&WATER-7**, **8** and **SOIL&WATER-17** are anticipated to minimize impacts below a level of significance. These measures are provided in detail in the Proposed Conditions of Certification section below.

Surface Water Hydrology

The impacts of the Modified BSPP on the local surface water hydrology are directly related to proposed onsite grading. The extent of grading of the Modified BSPP is much smaller than what was needed for the Approved BSPP. Grading of the Modified BSPP would only be needed where there are steep slopes or large variations in land topography so that solar panels are installed at roughly the same height. Flow through the project site would be maintained similar to pre-project conditions to the maximum practicable extent. Therefore, impacts on surface waters from the modified project are expected to be limited to a minimum.

The project Hydrologic Evaluation (NEBS 2013a, Appendix C) provides a summary of discharges at the downstream property boundary as well as some key points along the main drainage washes within the site. The Hydrologic Evaluation also compares existing total outflow at the project boundary and also at several cross-sections in the drainage washes with post-development outflows at the project boundary for 10-, 25- 50-, and 100-year 24 hour precipitation events. Comparisons show that changes in flow depths and velocities at key points within the project and along the project boundaries are very small.

Engineered drainage channels would be constructed along the project boundary wherever the potential for the interception of offsite surface flows exists. These channels would intercept offsite flows and convey them around and through the project for discharge at four discreet locations along the downstream project boundary. Onsite flows would be discharged into these channels at discreet locations. The conceptual layout of the drainage system is provided on **Soil and Water Figure 11**, Conceptual Drainage Plan. Discharge of flow along the downstream Project boundary would be through the use of what the preliminary Grading and Drainage Plans for the project refer to as “end diffuser” structures. The intent of these structures is to reduce flow velocities and allow flow to spread out in a manner that mimics existing sheet flow conditions downstream of the project.

Releasing flow back to native ground in a manner similar to existing conditions is of concern for two primary reasons. The first is that flow collected from a large area and discharged in a more concentrated area may result in the potential for increased erosion. The second potential concern is that the significant change in flow patterns may essentially “dry-up” discreet areas downstream of the project potentially resulting in a significant impact to the existing biological resources beyond the project boundary. This issue is discussed further in the **Biological Resources** section of this SA.

Alteration of Drainage Patterns

<u>Construction and Operation</u>

Onsite Drainage

All existing washes and floodplains within the Approved BSPP boundary would have been completely eliminated by the grading of approximately 7,000 acres to provide the flat, uniform and vegetation-free topography required for the construction and operation of the solar mirror array. The existing natural drainage system was going to be replaced with a system of constructed swales and channels designed to collect and convey onsite flows to designated points of discharge from the project. Onsite stormwater from the approved project was going be discharged directly offsite without the use of detention basins or any other means to capture, control, or retain onsite flows.

The exception to the impacts discussed above is along the linear facilities, which in the case of the Approved BSPP was going to be limited to the transmission line corridor. There was likely going to be localized grading at the drainages which cross the transmission line corridor alignment to allow vehicular access during construction and operation of the facility. Localized grading along linear facilities could impact offsite portions of the existing drainages if not properly stabilized. Diversion and/or channelization of existing drainages should not occur. The impact to onsite drainage patterns would have been significant.

For the Modified BSPP, no extensive grading would be needed, and therefore, almost all natural drainage courses would be kept unaltered. The only exception to this are the areas around the operation and maintenance building and the switchyard where impermeable surfaces would be created and flows around those structures would have to be redirected, but these are relatively very small areas in relation to the total area of the project. As a result of the elimination of the channels to reroute flow off-site, the associated large flows and potential for off-site erosion and channel undercutting would also be eliminated. Since natural flow patterns would largely be preserved for the Modified BSPP, both upstream and downstream flow and erosion and sedimentation conditions would be largely unaltered.

Flood Hazards

Flood hazards include direct flooding due to overtopping of nearby rivers or streams resulting from severe rainstorms, or secondary flooding due to seismic activity creating tsunamis (tidal waves) or seiches (waves in inland bodies of water).

To identify the different types of flood risks for a given location, flood hazard maps were developed by the Federal Emergency Management Agency (FEMA) to identify areas prone to flooding. Comparing the Modified Project site location to these maps, staff found that:

- The Modified BSPP is not located within the 100-year floodplain as defined by FEMA.
- The Modified BSPP site is located roughly 160 miles inland with no dams in the region. In addition, no levees or inland bodies of water are located in the area.

The Modified BSPP would not impede or significantly redirect flood flows of the FEMA designated 100-year floodplain. In addition, the project would not be affected by dam failure, tsunami, or seiche. The Modified BSPP would not have significant impacts pertaining to these identified flood hazard areas. (For discussion on additional potential hazards that could be caused by soil failure such as mudflow, landslide and liquefaction, see the **GEOLOGY and PALEONTOLOGY** section of this **SA**.)

Construction of the project could create temporary courses to redirect or even block water flows away from active areas of construction. This temporary redirection and possible blocking in some cases can have some serious impacts in terms of on-site flooding and unplanned rerouting of natural drainage patterns. Staff believes that the possibility of unplanned rerouting of natural drainage patterns could cause significant onsite flooding, particularly during construction activities when soil is most disturbed and BMPs may not be fully functional. Also, some construction practices that typically occur at other non-desert construction sites can have unintended impacts in a desert setting with ephemeral washes. For example, a temporary dirt access road used to transport heavy equipment across the site can block the path of a large desert wash (braiding of shallow channels that could be a mile wide and very difficult to identify). Since tropical storms in this region are mostly unpredictable and can have short bursts of very intense rainfall, a seemingly minor rerouting of storm water flows can result in significant flooding damage. Construction period flooding can result in damages to onsite facilities, interference with the construction schedule, and potential exposure of workers to flood conditions. Staff added language to Item C of Condition of Certification **SOIL&WATER-1** to minimize these impacts.

In addition, since tropical storms in this region are mostly unpredictable and flash floods can result in enormous amounts of water in a very short time. People usually tend to underestimate the dangers of flash floods, and as a result they may attempt to drive or walk through the swift flows to cross them. However, as little as two-foot deep water is enough to carry away most passenger vehicles, and six inches of swiftly moving water can cause a person to lose balance[2]. Although the operation and maintenance building would be located outside of the large desert washes, the paved main access road and several other internal unpaved roads would be placed within washes that are expected to flood during heavy storms. These roads would be subject to severe flooding from flash floods that can be the result of short but intense bursts of rain as it was observed in other projects such as Genesis Solar Energy Project and Ivanpah Solar Electric Generating System project. Flash flooding has the potential to cause damage to the project site and also may result in injuries to project staff, or at least cause some staff to be stranded and unable to leave for a safe area. To avoid injury or death during a large flood event, the project would require a Construction Flood Safety Plan and Operations Flood Safety Plan to protect personnel at the project site (see **WORKER SAFETY-1** and **-2** in the **WORKER SAFETY AND FIRE PROTECTION** section of this FSA). These plans would provide safety procedures for on-site workers during a very large flood event (100-year flooding or larger).

Mitigation

Staff acknowledges that the project owner has completed a thorough hydrologic analysis, but notes that predicted flow depths and velocities on undeveloped alluvial fans have potential uncertainty. The consequences of flash flood damage or modified sedimentation and erosion rates may be significant. Staff believes that implementation of Condition of Certification **SOIL&WATER-1** would minimize impacts related to flood hazards associated with construction and operation of the project to below a level of significance.

Surface Water Quality

Project storm water may encounter soil or chemicals deleterious to aquatic and terrestrial plant and wildlife. The project owner proposes to implement BMPs for managing potentially harmful storm water and protect water quality. Potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. The project would not alter natural storm water drainages and use BMPs to reduce potentially significant impacts related to concentrated drainage that might be created due to the construction of the administration building and other structures and ensuing soil erosion and sediment transport offsite. The

[2] NOAA, March 2005, Publication# PA 200467

following discusses the potential impacts and the proposed conditions of certifications below.

Construction

Potential threats to surface water quality related to construction includes: potential increases in sediment loads to adjacent streams and washes, and accidental spills of hydrocarbon fuels and greases associated with construction equipment. The implementation of BMPs as defined in Conditions of Certification **SOIL&WATER-1** (and found in the **Proposed Conditions of Certification** section below) would reduce potential water quality impacts to insignificant.

Operation

Potential threats to surface water quality related to operations includes: potential increases in sediment loads to adjacent washes; accidental spills of hydrocarbon fuels and greases associated with operations equipment; and accidental releases from RO reject water.

A Drainage Erosion and Sedimentation Control Plan would be required (see Conditions of Certification **SOIL&WATER-1)** prior to onsite operations and will reduce the potential for increased sediment loads to less than significant. Potential spills will be managed through hazardous materials management (see section C.4). The operation of the surface impoundments will include 2 feet of freeboard to minimize the potential for overtopping during 100-year precipitation event. In addition, the surface impoundments (evaporation ponds) would operate under the waste discharge requirements that include operational and leak detection monitoring as stipulated in **SOIL&WATER-7** and would reduce the potential for impacts to surface water quality to less than significant.

Mitigation

No significant impacts are anticipated related to surface water quality. Implementation of Conditions of Certification **SOIL&WATER-1** and **7** is anticipated to further minimize potential for impacts related to surface water quality associated with construction and operation of the project.

CEQA Level of Significance

Section 15064.7 of the CEQA Guidelines defines a significance threshold as being an “identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect would normally be determined to be significant by the agency and compliance with which means the effect would normally be determined to be less than significant.”

The analysis of the significance of potential environmental effects related to soil and water resources contained herein is made based on the criteria specified in the Methodology and Thresholds section above for Determining Environmental Consequences.

FACILITY CLOSURE PLAN

The standards applied to closure of the facility for the modified project would not be different from those applicable to the Approved BSPP.

The principal materials incorporated into the PV arrays include glass, steel, and various semiconductor metals. The module production process will be designed to minimize waste generation and maximize the recyclability and reusability of component materials. Some manufacturers employ the compound CdTe as the semiconductor material. Cadmium telluride is a stable compound consisting of cadmium (Cd) and tellurium (Te). Cd, produced primarily as a byproduct of zinc refining, is a human carcinogen as an independent element; however, when combined with Te, a byproduct of copper refining, it forms the stable, non-hazardous compound CdTe. In module manufacturing the CdTe is safely sequestered for the over 30-year lifetime of the module, after which it is recycled for use in new solar modules or other new products. If the BSPP selects panels that incorporate CdTe, it would participate in the manufacturer's recycling program.

Facility closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance, including closure for overhaul or replacement of equipment. Causes for temporary closure include a disruption in the water supply or damage to the plant from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations, owing to plant age, damage to the plant beyond repair, economic conditions, or other reasons.
Future circumstances that could affect closure are largely unknown at this time; however compliance with all applicable LORS, and any local and/or regional plans would be required. A facility closure plan must address all concerns in regard to potential erosion and impacts on water quality, as described in Conditions of Certification **SOIL&WATER-10** and **General Condition COM-15**. For more details about requirements for temporary and permanent closure please refer to **GENERAL CONDITIONS** section of this analysis.

CUMULATIVE IMPACTS

The **Executive Summary Section** 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 Modified Project. In summary, these projects are:

- Renewable energy projects on BLM, State, and private lands, as shown on **Executive Summary Figure 1** and in **Executive Summary Table 1.** 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 vicinity of the City of Blythe, as shown on **Executive Summary Figure 1, and Executive Summary Table 1. Exceutive Summary Table 1** presents existing as well as foreseeable projects in this area. The table indicates 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 National Environmental Policy Act (NEPA). Even if the cumulative projects described in the **Executive Summary** section have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this SA.

Effects of Past and Present Projects

Soils in the geographic region have been left essentially undisturbed by human development.

Groundwater resources in the region were utilized to support a variety of agricultural ventures in the 1980’s. As previously stated, the groundwater levels in the PVMGB have generally remained stable over recent history. The relatively stable groundwater levels that have been measured over the decades-long period of time suggest that groundwater withdrawal from the underlying aquifer has not significantly changed the water balance within the PVMGB. This is probably in large part due to recharge of groundwater from the Colorado River (AECOM, 2009).

The majority of the agricultural ventures that were present in the 1980s-1990s were abandoned in the 1990’s, returning groundwater resources to a balanced inflow and outflow (based upon modeling previously performed by AECOM). Current projects that are underway are believed to be represented in the existing setting described in C.9.4.1.

Future Foreseeable Projects

Foreseeable projects that may impact the soil and water resources of the area were deemed to include only those projects located in the PVMGB along with one project in the Chuckwalla Valley Groundwater Basin. Genesis Solar Energy Project (GSEP) is located west of the boundary of the PVMGB and the Chuckwalla Valley Groundwater Basin. Based on the impact analysis conducted for the GSEP related to groundwater basin balance, estimates of the potential reduction in groundwater inflow to the PVMGB from the operation of the GSEP range from 71 afy to 320 afy in 2043 and consequently have been included in the list of Future Foreseeable Projects that may impact soil and water resources in the PVMGB. **Soil and Water Table 20,** Foreseeable Projects and Anticipated Water Use, lists the foreseeable projects and the anticipated water use associated with each of the projects.

Foreseeable Renewable Projects in the California Desert

All of the foreseeable projects were renewable projects and are listed in **Soil and Water Table 20**, Foreseeable Projects and Anticipated Water Use.

Contribution of the Project to Cumulative Impacts

Construction and Operation

The construction of the Modified BSPP 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 Modified BSPP. In addition, it is expected that some of the future and foreseeable projects described above may be operational at the same time as the Modified BSPP. As a result, there may be substantial long-term cumulative impacts during construction and operation of these projects related to soil and water resources. These impacts may include: soil erosion, changes in the groundwater basin balance, groundwater levels, and groundwater quality, and changes in surface water hydrology and quality.

Soil and Water Table 20
Foreseeable Projects and Anticipated Water Use

Project	Proponent	BLM Serial ID	Technology	Source	Use	Water Use – Solar and Other Renewable Projects (af)							Comments
						2014	2015	2016	2017	2018	2019	2020-2047	
Palo Verde Mesa Groundwater Basin													
Big Maria Vista Solar Project	Bullfrog Green Energy, LLC	CA 49702	Photovoltaic (500MW)	Groundwater	Construction	--	8	7	7	--	--	--	No construction water use provided in POD; assume total 22 af over three years construction.
					Operation	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
Blythe Airport Solar 1	US Solar	--	Photovoltaic (100MW)	Groundwater	Construction	--	--	--	--	--	--	--	No water usage given in POD. Assume water usage to be 20 percent of water usage for similar PV Operation
					Operation	0.04	0.04	0.04	0.04	0.04	0.04	0.04	
Blythe Energy Project II	Blythe Energy, LLC	--	Combined Cycle (520MW)	Groundwater	Construction	--	--	--	--	--	--	--	
					Operation	3,300	3,300	3,300	3,300	3,300	3,300	3,300	
Blythe PV Project	First Solar	--	Photovoltaic (7.5 MW)	Groundwater	Construction	--	--	--	--	--	--	--	Given small output, assume minimal water usage for operational use.
					Operation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
Desert Quartzite Solar Farm	First Solar (formerly OptiSolar)	CA 49377	Photovoltaic (601MW)	Groundwater	Construction	4	--	--	--	--	--	--	POD assumes facility startup in 2013 or 2014. Assumes 3.8 afy for operational use.
					Operation	3	3.8	3.8	3.8	3.8	3.8	3.8	
McCoy Soleil Project	enXco	CA 49490	Photo Tower (136MW)	Groundwater	Construction	--	--	--	--	--	--	--	POD assumes facility startup at end of 2013. Assumes water use 600 afy for operational use.
					Operation	600	600	600	600	600	600	600	

Project	Proponent	BLM Serial ID	Technology	Source	Use	Water Use – Solar and Other Renewable Projects (af)							Comments
						2014	2015	2016	2017	2018	2019	2020-2047	
McCoy Solar Projec	NextEra	CA 48728	Photovoltaic (750 MW)	Groundwater	Construction	250	--	--	--	--	--	--	POD assumes 30-month construction period with facility startup at end of 2013. Assumes water use of 750 af over total construction period and 30 afy for operational use thereafter.
					Operation	30	30	30	30	30	30	30	
Blythe Solar Power Project	Palo Verde Solar I, LLC	CA 48811	Photovoltaic (485 MW)	Groundwater	Construction	300	300	300	300	--	--	--	AFC assumes 48 month construction period with total water usage during construction to be 1,200 af and 40 afy usage during operational phase. Construction water usage averaged over a period of 4 years starting in 2014 (proposed construction start is 2nd quarter 2014).
					Operation	--	10	30	40	40	40	40	
Total						4,487	4,244	1,046	4,274	3,974	3,974	3,974	
Chuckwalla Valley Groundwater Basin													
Genesis Solar Energy Project	Genesis Solar LLC	CACA 48880	Parabolic Trough (250MW)	Groundwater	Construction	--	--	--	--	--	--	--	Based on Final Energy Commission Decision
					Operation	202	202	202	202	202	202	202	

Soil Erosion

Construction of the Modified BSPP would result in both temporary changes at the project site which could incrementally increase local soil erosion and storm water runoff during construction. The project would be expected to contribute only a small amount to the possible short term cumulative impacts related to soil erosion because the project applicant will be required to implement the mitigation measures defined in this analysis, which are expected to bring short term impacts below the level of significance.

Operation of the Modified BSPP would result in minimum permanent changes at the project site, which changes are not likely to result in significant increases in local soil erosion and storm water runoff.

The Modified BSPP would be expected to contribute only a small amount to these possible long-term operational cumulative impacts because potential project-related soil erosion and increased sedimentation resulting from storm water runoff are expected to be reduced to a level of insignificance through implementation of the proposed conditions of certification specified in the **Proposed Conditions of Certification** section below.

Groundwater Basin Balance

It is anticipated that extraction of groundwater from the PVMGB during construction of the proposed Project will be approximately 1,200 af. Total groundwater use for the foreseeable future projects within the region is anticipated to be 17,580 af (including the Modified BSPP) for the projected 48-month construction period of the modified project. The storage capacity of the PVMGB is approximately 5,000,000 af. The amount of cumulative groundwater extraction anticipated for construction of the modified project and the future/foreseeable projects amounts to 0.35 percent of the total stored groundwater. The Modified BSPP would be expected to account for 0.05 percent of the extraction of total stored groundwater, which is not considered a significant impact.

Extracting groundwater to support operation of the Modified BSPP and the construction and operation of the foreseeable projects defined in **Soil and Water Table 20**, above, is expected to approach 5,000 afy, which will not significantly impact basin storage. Total groundwater expected to be extracted from the PVMGB over the life of the projects will be approximately 122,000 af or approximately 2.5 percent of the total estimated groundwater in storage in the basin. The foreseeable projects however will likely induce subsurface inflow from the Colorado River. As previously stated, the Colorado River is fully appropriated and any groundwater production in the PVMGB may increase subsurface flow from the Colorado River. The subsurface inflow from the Colorado River could be significant and would be a significant impact.

Operation of all of the foreseeable projects will have an impact on inflows from the Palo Verde Valley Groundwater Basin and the Colorado River. Implementation of the Conditions of Certification **SOIL&WATER-2** specified in the **Proposed Conditions of Certification** section below, is anticipated to reduce the potential for impacts to inflow from the Colorado River for this project.

Groundwater Levels

A numerical model was used to assess the impacts of the pumping of the Approved BSPP and foreseeable projects in the vicinity on the water table elevation in the PVMGB and to estimate the impacts on underground flow to the Colorado River and to assess if any of the project pumping is considered Colorado River water. The regional model used by AECOM (2010) is a two-dimensional superposition model developed using MODFLOW code (Harbaugh, 2000) for the Parker-Palo Verde-Cibola area, which includes the PVMGB and the Project site. The model employed a simple vertical geometry and a large grid spacing to evaluate the impacts from groundwater pumping on the Colorado River.

The modeling results for the Approved BSPP suggest (see **Soil and Water Table 21**) that during the life of all of the foreseeable projects, groundwater level declines of five feet or more will be located at a distance of more than 22,000 feet from the project site. The closest existing well is located at a distance of 9,000 feet. Consequently, the potential impact to water levels in existing wells appears to be cumulatively significant.

The groundwater model has not been revised to reflect pumping of the modified project since the pumping of the modified project is much less than that of the Approved BSPP and therefore impacts would be much less than the Approved BSPP both in terms of well interference and flow into the Colorado River.

Operation of all of the foreseeable projects will have an impact on groundwater levels in the PVMGB. Implementation of the Conditions of Certification **SOIL&WATER-3** through **SOIL&WATER-5,** specified in the **Proposed Conditions of Certification** section below, is anticipated to reduce the potential for impacts to below the level of significance.

Groundwater Quality

There is a potential that significant cumulative groundwater quality impacts could occur during construction if contaminated or hazardous materials used during construction were to be released and migrate to the groundwater table.

Soil and Water Table 21
Results of Numerical Modeling for Approved Project and All Foreseeable Projects

Model Scenario (a)	Objective	Zone 1		Zone 2		Year	Drawdown (feet)	Distance from Production Well to 1-foot Contour	Distance from Production Well to 5-foot Contour	Storage Change (acre-feet)	Storage Change (percent of Recoverable) (b)
		Transmis-sivity	Storativity	Transmis-sivity	Storativity						
Run 9	Cumulative impacts assessment following the projects listed on Table DR Soil and Water-191-1	10,000	0.2	6,300	0.2	2015	15.44	17,402	1,015	16,570	0.33 percent
						2029	12.37	35,745	5,845	79,253	1.59 percent
						2043	15.16	54,204	22,545	139,540	2.79 percent
Run 10	Cumulative impacts assessment following the projects listed on Soil and Water Table 21	28,000	0.2	26,000	0.2	2015	6.19	11,701	30	16,473	0.33 percent
						2029	6	58,245	60	71,606	1.43 percent
						2043	7.31	59,802	2,645	114,751	2.30 percent
Run 17	Determine relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	28,000	0.02	---	---	2015	7.08	42,839	95	3,123	0.06 percent
						2029	4.82	69,295	0	5,233	0.10 percent
						2043	4.91	69,295	0	6,280	0.13 percent
Run 18	Determine relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	28,000	0.2	---	---	2015	5.83	5,005	15	3,948	0.08 percent
						2029	3.83	7,227	0	11,503	0.23 percent
						2043	4.02	18,424	0	17,735	0.35 percent
Run 19	Determine relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	10,000	0.2	---	---	2015	15.19	8,133	903	3,986	0.08 percent
						2029	9.83	21,234	408	12,279	0.25 percent
						2043	10.24	26,136	595	20,227	0.40 percent

Notes
(a) - The pumping schedule for the water supply well onsite and those used for the cumulative impacts analysis are provided in Soil and Water Table 21
(b) - The storage change is based on a recoverable storage of 5,000,000 acre-feet as reported by the DWR (2004)

Source: AECOM, 2010.

The Modified BSPP would be expected to contribute only a small amount to the possible short-term cumulative impacts related to groundwater quality, given the distance to the groundwater table (>100 feet bgs) over the PVMGB and the proposed implementation of a hazardous material management plan as well as monitoring plans associated with operation of the surface impoundments, septic systems, and other various operations. With implementation of the mitigation measures specified in the **Proposed Conditions of Certification** section below, cumulative impacts to groundwater quality are anticipated to be below the level of significance.

Also significant groundwater quality impacts could potentially occur during operations if contaminated or hazardous materials used during operations were to be released and migrate to the groundwater table.

The Modified BSPP would be expected to contribute only a small amount to possible long-term operational cumulative impacts, given the distance to the groundwater table (>100 feet bgs) over the PVMGB and the proposed implementation of a hazardous material management plan as well as monitoring plans associated with operation of the surface impoundments, septic systems and other various operations. With the implementation of proposed mitigation measures provided in the **Proposed Conditions of Certification** section below, impacts to groundwater quality are anticipated to be below the level of significance.

Surface Water Hydrology

The cumulative impacts of the Modified BSPP on the local surface water hydrology are directly related to proposed onsite grading. The proposed projects will change both the extent and physical characteristics of the existing floodplain within each project site as well as downstream of each project site, thus it will change the sediment transport and depositional characteristics of each of the project sites.

The Modified BSPP would be expected to contribute only a small amount to the possible short-term cumulative impacts related surface water hydrology because the implementation of the mitigation measures specified in the **Proposed Conditions of Certification** section below would reduce the cumulative impacts below the level of significance.

The impacts of the proposed projects on the local surface water hydrology are directly related to proposed operation of a network of engineered collector/conveyance channels designed for the purpose of protecting the various projects from flooding. The proposed projects will change both the extent and physical characteristics of the existing floodplain within the each project site as well as downstream of each project site, as well as change the sediment transport and depositional characteristics of each of the project sites.

The Modified BSPP would be expected to contribute only a small amount to possible long-term operational cumulative impacts because implementation of proposed mitigation measures provided in the **Proposed Conditions of Certification** section below will minimize impacts to below the level of significance.

Surface Water Quality

It is expected that stormwater generated on the various project sites may encounter soil or chemicals deleterious to aquatic and terrestrial plant and wildlife. It is expected that all of the projects would be required to implement BMPs for managing potentially harmful storm water and protect water quality. Potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. It is expected that all of the projects would have Hazardous Material Management Plans to reduce this potential impact to insignificant.

All of the proposed projects would alter natural storm water drainages and the expected use of BMPs would reduce potentially significant impacts related to concentrated drainage and ensuing soil erosion and sediment transport offsite.

Operation of the modified project is not expected to result in long-term adverse impacts related to surface water quality. Stormwater generated on the various project sites may encounter soil or chemicals deleterious to aquatic and terrestrial plant and wildlife.

The modified project would be expected to contribute only a small amount to the possible short-term cumulative impacts related to surface water quality with implementation of the mitigation measures described in the **Proposed Conditions of Certification** section below.

COMPLIANCE WITH LORS

Applicable Federal, State, and local LORS are summarized discussed in the following text. Non-applicable Federal and State LORS are also discussed to explain why they are not applicable.

Federal

Clean Water Act (CWA) of 1977 (Including 1987 Amendments) Sections 401, 402 and 404

The primary objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the Nation's surface waters. Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants; "conventional" pollutants, such as biochemical oxygen demand, total suspended solids, oil and grease, and pH; and "non-conventional" pollutants, including any pollutant not identified as either conventional or priority.

CWA of 1977 (Including 1987 Amendments) Section 401

Section 401 of the CWA requires certification from the CRBRWQCB that the proposed Project is in compliance with established water quality standards. Projects that have the potential to discharge pollutants are required to comply with established water quality objectives. These requirements include the implementation of BMPs during site grading activities and other activities associated with construction of the facility.

Section 401 provides the State Water Resources Control Board (SWRCB and the CRBRWQCB with the regulatory authority to waive, certify, or deny any proposed federally permitted activity, which could result in a discharge to waters of the State. To waive or certify an activity, these agencies must find that the proposed discharge would comply with state water quality standards. According to the CWA, water quality standards include beneficial uses, water quality objectives/criteria, and compliance with the Environmental Protection Agency's (EPA) anti-degradation policy.

No license or permit may be issued by a federal agency until certification required by Section 401 has been granted. Under the CWA, U.S. Army Corps of Engineers (USACOE) Section 404 permits are subject to CRBRWQCB Section 401 Water Quality Certification (Title 23 CCR Sections 3830 through 3869). As such, a determination of "federal waters" under Section 404 is required by the USACOE. The ephemeral drainages on the Project site were found not to conform to the requirements for designation as jurisdictional waters of the U.S. However, this finding still needs to be formally confirmed by the USACOE and this process is underway.

While there is not a direct requirement under a 404 jurisdiction, the CRBRWQCB has authority under the Porter-Cologne Water Quality Control Act (amended January 1, 2010) (Porter-Cologne) to regulate discharge of waste to waters of the state. The definition of the waters of the state is broader than that for waters of the United States in that all waters are considered to be a water of the state regardless of circumstances or condition. The term "discharge of waste" is also broadly defined in Porter-Cologne, such that discharges of waste include fill, any material resulting from human activity, or any other "discharge" that may directly or indirectly impact waters of the state relative to implementation of Section 401 of the CWA.

Porter-Cologne authorizes the CRBRWQCB to regulate discharges of waste and fill material to waters of the state, including "isolated" waters and wetlands, through the issuance of waste discharge requirements (WDRs). Under Porter-Cologne all parties proposing to discharge waste that could affect the quality of waters of the state, other than into a community sewer system, shall file with the appropriate CRBRWQCB a Report of Waste Discharge (ROWD) containing such information and data as may be required by the CRBRWQCB. As such, the project would file a ROWD for evaluation of 401 water quality impacts.

CWA Section 402

Direct and indirect discharges and storm water discharges into waters of the United States must be made pursuant to a National Pollutant Discharge Elimination System (NPDES) permit (CWA Section 402). NPDES permits contain industry-specific, technology-based limits and may also include additional water quality-based limits, and establish pollutant-monitoring requirements. A NPDES permit may also include discharge limits based on Federal or State water quality criteria or standards.

In 1987, the CWA was amended to include a program to address storm water discharges for industrial and construction activities. Storm water discharge is covered by an NPDES permit, either as an individual or general permit. The RWQCB administers the NPDES permit program under the CWA in the project area. Appendix L of the AFC for the proposed project includes a preliminary construction SWPPP/DESCP.

Clean Water Act Section 404

Activities resulting in the dredging or filling of jurisdictional waters of the U.S. require authorization under a Section 404 permit issued by the USACOE. The USACOE may grant authorization under either an individual permit or a nationwide permit to address operations that may affect the ephemeral washes on the project site. Section 404 permits are also subject to CWA Section 401 water quality certification through the CRBRWQCB.

An evaluation for jurisdictional waters on the project site was performed by the Applicants. The ephemeral drainages on the site were found not to conform to the requirements for designation as jurisdictional waters of the U.S. Discussions with the USACOE indicated that the drainages would not be considered jurisdictional waters of the U.S. (S. Sanders, 2010). Several drainages on the project site were delineated as jurisdictional waters of the State. A report documenting the results of the evaluation of the presence of jurisdictional waters of the U.S. is provided in Appendix F to the AFC for the proposed project.

State

State of California Constitution Article X, Section 2

Article X, Section 2 prohibits the waste or unreasonable use of water, regulates the method of use and method of diversion of water and requires all water users to conserve and reuse available water supplies to the maximum extent possible.

California Storm Water Permitting Program

California Construction Storm Water Program. Construction activities that disturb one acre or more are required to be covered under California's General Permit for Discharges of Storm Water Associated with Construction Activity, Water Quality Order 99-08-DWQ (General Construction Permit CAS 000002).

Activities subject to permitting include clearing, grading, stockpiling, and excavation. The General Construction Permit requires the development and implementation of a SWPPP that specifies BMPs that would reduce or prevent construction pollutants from leaving the site in storm water runoff and would also minimize erosion associated with the construction Project. The SWPPP must contain site map(s) that show the construction site perimeter; existing and proposed structures and roadways; storm water collection and discharge points, general topography both before and after construction; and drainage patterns across the site. Additionally, the SWPPP must describe the monitoring program to be implemented. The Project also would prepare a DESCP to meet Energy Commission requirements. The content of a DESCP is very similar to a SWPPP, but the DESCP covers both construction and operation in one document whereas separate SWPPPs are prepared for construction and operation.

California Industrial Storm Water Program. Industrial activities with the potential to impact stormwater discharges are required to obtain a NPDES permit for those discharges. In California, an Industrial Storm Water General Permit, Order 97-03-DWQ (General Industrial Permit CAS 000001) may be issued to regulate discharges associated with ten broad categories of industrial activities, including electrical power generating facilities. The General Industrial Permit requires the implementation of management measures that would protect water quality. In addition, the discharger must develop and implement a SWPPP and a monitoring plan. Through the SWPPP, sources of pollutants are to be identified and the means to manage the sources to reduce storm water pollution described. The monitoring plan requires sampling of storm water discharges during the wet season and visual inspections during the dry season.

A report documenting the status of the program and monitoring results must be submitted to the CRBRWQCB annually by July 1. The General Industrial Permit, which requires the development and implementation of a SWPPP, is required for the Project's operations phase. The Applicant would prepare a separate SWPPP that outlines the monitoring and reporting plan, along with storm water mitigation measures for the facility based on BMPs. At the present time, the facility does not have an Standard Industrial Classification (SIC) code that would require compliance with the California's Industrial Storm Water Program.

California Water Code

Section 461. Stipulates that the primary interest of the people of the State of California is the conservation of all available water resources and requires the maximum reuse of reclaimed water as an offset to using potable resources.

There are no plans for the project to use reclaimed water. However, the project would be developed to minimize water usage by recycling RO reject as much as possible before discharging to the evaporation ponds

Section 1200 "Water Rights."

All water in California falls within one of three categories: surface water, percolating groundwater, or "subterranean streams that flow through known and definite channels." California's water rights law is a hybrid system in that the use of certain types of water requires a permit from the SWRCB, while other types of uses are governed by common law. Only surface water and subterranean stream water are within the permitting jurisdiction of the SWRCB. Since 1914, appropriation of those waters has required a SWRCB permit, and is subject to various permit conditions.

Interstate water courses (such as the Colorado River) have additional contract requirements that are the equivalent of permits. For example, use of Colorado River water requires a contract with the Secretary of the Interior (through the Bureau of Reclamation).

Pre-1914 appropriative and riparian rights do not require a permit. Riparian rights are correlative rights of equal priority among all riparian right holders. The place of use of such water is limited to riparian property (property that is contiguous to a watercourse) that has not had its riparian rights severed. Riparian rights are senior to any appropriative rights, and may not be separated from the riparian parcel and used elsewhere.

Groundwater can be (a) the underground portion of a surface water course (subject to the same rights/permits as the affiliated water course); (b) a wholly underground water course which is treated like a water course; or (c) percolating groundwater. Water subject to appropriation is defined in Water Code Section 1201, as "all water flowing in any natural channel," except water that is or may be needed for use upon riparian land or water that is otherwise appropriated. The SWRCB's authority over groundwater extends only to the underground portion of a surface stream and to the water in un-appropriated subterranean streams that flow through known or defined channels, except as it is or may be reasonably be needed for useful and beneficial purposes upon lands riparian to the channel through which it is flowing. The traditional test to establish SWRCB jurisdiction over groundwater was whether there is sufficient evidence of bed and banks and water flowing along a line of a surface stream (Sax 2002).

Recent case law has redefined the boundaries of an underground stream to mean the bedrock bottom and side boundaries that are materially less permeable than the alluvium holding groundwater found within an alluvial valley across which flows a surface stream. If there is insufficient evidence to support a finding that the groundwater fits this definition, the SWRCB has no jurisdiction and no permit is required to appropriate the water.

Percolating groundwater has no SWRCB permit requirement and supports two kinds of rights: (a) overlying rights, a correlative right of equal priority shared by all who own overlying property and use groundwater on the overlying property; and (b) groundwater appropriative rights for use of the overlying property or on overlying property for which the water rights have been severed. The right to use groundwater on property that is not as an overlying right is junior to all overlying rights, but has priority among other appropriators on a first in time use basis. Overlying users cannot take unlimited quantities of water without regard to the needs of other users. Surplus groundwater may be appropriated for use on non-overlying lands, provided such use would not create an overdraft condition.

Riparian water rights, groundwater rights and appropriative rights are all subject to modification to some degree if there is a basin-wide adjudication, which proceeding can be commenced before the SWRCB as an adjudicative body (not a permitting role) or before a Court. In adjudication, unused riparian rights and unused overlying rights can be subordinated to appropriative rights.

Water rights in California can be held by any legal entity. Thus the owner can be an individual, related individuals, non-related individuals, trusts, corporations and/or government agencies. Water rights are considered real property. Riparian rights and overlying groundwater rights are lost if severed from the land, while appropriative rights can be preserved and transferred to other properties. Transfers of water for use elsewhere are permissible without transfers of water rights, subject to many other conditions and approvals, including a "non-injury" to other water rights holders test, assessment of environmental impacts, and for post-1914 appropriative rights, SWRCB approval of any change in place of use, diversion point and/or purpose of use.

The California Water Code allows any local public agency that provides water service whose service area includes a groundwater basin or portion thereof that is not subject to groundwater management pursuant to a judgment or other order, to adopt and implement a groundwater management plan (California Water Code Sections 10750 et. seq.) Groundwater Management Plans often require reports of pumping and some restrictions on usage. There is no Groundwater Management Plan for the PVMGB listed on the DWR website on Groundwater Management Plans.

The California Legislature has found that by reason of light rainfall, concentrated population, the conversion of land from agricultural to urban uses and heavy dependence on groundwater, the counties of Riverside, Ventura, San Bernardino and Los Angeles have certain reporting requirements for groundwater pumping. Any person or entity that pumps in excess of 25 af of water in any one year must file a "Notice of Extraction and Diversion of Water" with the SWRCB. (See Water Code Sections 4999 et. seq.) The project would be subject to this requirement since it is located in Riverside County and would require more than 25 afy. Condition of Certification **SOIL&WATER-9** would ensure the applicant complies with this requirement.

The project is located in Riverside County and the Palo Verde Mesa has no perennial streams. The project site is located on BLM land that overlies the PVMGB, which has a surface area of about 226,000 acres. Wells extracting water from the groundwater aquifer beneath the project site could be drawing water that is connected to flow of the Colorado River, either by underflow from the river or tributary to the river. A method was developed by the USGS, in cooperation with the USBR, to identify groundwater wells outside the flood plain of the lower Colorado River that yield water that will be replaced by river water. Wells placed into the groundwater beneath the project site that extract groundwater may be considered to be drawing water from the Colorado River and require an entitlement to extract groundwater. The specific method to determine whether wells draw water from the Colorado River (referred to as the accounting surface) has not been promulgated by the USBR. Entitlements to extract and use the groundwater beneath the site are granted by the USBR through their designated representative in California, the Colorado River Board of California. After eligibility for groundwater extraction has been approved by the USBR, a contract must be established with the City of Needles to acquire the water. In California, the City of Needles monitors the use of water extracted from the river aquifer and is the designated contracting agent for the USBR.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1967, Water Code Section 13000 et. seq. (amended January 1, 2010) requires the SWRCB and the nine RWQCBs to adopt water quality standards to protect State waters. Those standards include the identification of beneficial uses, narrative and numerical water quality criteria, and implementation procedures. Water quality standards for the proposed project area are contained in the Water Quality Control Plan for the Colorado River Basin Region (Basin Plan), which was adopted in 1994 and was amended in 2006. This plan sets numeric and/or narrative water quality criteria controlling the discharge of wastes to the State’s waters and land.

The project would comply with Title 23 CCR Division 3, Chapters 9 and 15 regarding the establishment of requirements for waste discharge and reporting along with requirements specifying conditions for the protection of water quality. Under Chapter 9, the CRBRWQCB is required to issue a ROWD for discharges of waste to land pursuant to the Water Code. The report requires the submittal of information regarding the proposed discharge and waste management unit design and monitoring program. WDRs issued by the CRBRWQCB provide construction and monitoring requirements for the proposed discharge. Chapter 15 outlines siting, construction, and monitoring requirements for waste discharges to land for landfills, surface impoundments, and waste piles. The chapter provides closure and post-closure maintenance and monitoring requirements for Class II designated waste facilities that are applicable to this project.

Section 13050

Surface waters (including ephemeral washes) that are affected by the project are waters of the State and are subject to State requirements and the CRBRWQCB's authority to issue WDRs for construction and industrial storm water activities.

Section 13260 et seq.

This section requires filing with the appropriate CRBRWQCB a ROWD for activities in which waste is discharged that could affect the water quality of the State. The report shall describe the physical and chemical characteristics of the waste and include the results of all tests required by regulations adopted by the board, any test adopted by the Department of Toxic Substances Control (DTSC) pursuant to Section 25141 of the Health and Safety Code for extractable, persistent, and bioaccumulative toxic substances in a waste or other material, and any other tests that the SWRCB or CRBRWQCB may require.

In accordance with Water Code Section 13263, the [State Water Board / Regional Water Board] hereby "prescribes" the waste discharge requirements as adopted by the California Energy Commission for the proposed project. Because the Energy Commission has exclusive permitting authority over the project under Public Resources Code section 25500, the State Board "prescribes" the waste discharge requirements for the sole purpose of authorizing the Regional Board to enforce them and undertake associated monitoring, inspection, and annual fee collection as if the waste discharge requirements were adopted by the Board.

Section 13173 (Designated Wastes)

This section defines designated waste as either: a) hazardous waste that has been granted a variance from hazardous waste management requirements pursuant to Section 14142 of the Health and Safety Code, or, b) non-hazardous waste that consists of, or contains, pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or could reasonably be expected to affect beneficial uses of the waters of the state contained in the appropriate state water quality control plan.

Section 13240 et seq. (Water Control Plan)

The Basin Plan for the Colorado River Basin Region establishes water quality objectives, including narrative and numerical standards that protect the beneficial uses of surface and ground waters in the region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provides comprehensive water quality planning. The following chapters are applicable to determining appropriate control measures and cleanup levels to protect beneficial uses and to meet the water quality objectives: Chapter 2, Beneficial Uses; Chapter 3, Water Quality Objectives; and the sections of Chapter 4, Implementation, entitled “Point Source Controls” and “Non-Point Source Controls.”

- Beneficial Uses: Chapter 2 of the Basin Plan describes beneficial uses of surface and ground waters. Beneficial uses of surface waters for the Palo Verde Mesa are not listed in the Basin Plan. The beneficial uses of ground waters of the Palo Verde Mesa Hydrologic Unit (717.00) are: municipal and domestic supply, industrial service supply, and agricultural supply.
- Water Quality Objectives: Region-wide numeric and narrative objectives for general surface waters are described in Chapter 3 of the Basin Plan under the “General Surface Water Quality Objectives” and region-wide objectives for groundwater under the “Ground Water Objectives.”
- Waste Discharge Requirements: Chapter 4 of the Basin Plan describes “Point-Source Controls” for wastewater reclamation and reuse, stormwater, and septic systems. The discussion of “Non-Point Source Controls” in the Basin Plan describes the authority given to the CRBRWQCB to certify projects for CWA Section 401 permits.

Section 13243

Under this section, the Regional Water Boards are granted authority to specify conditions or areas where the discharge of waste would not be permitted. The discharge of designated waste can only be discharged to an appropriately designed waste management unit.

Section 13263 (Waste Discharge Requirements)

The CRBRWQCB regulates discharges fill material, including structural material and/or earthen wastes into wetlands and other waters of the State through WDRs. The CRBRWQCB considers WDRs necessary to adequately address potential and planned impacts to waters of the State and to require mitigation for these impacts to comply with the water quality standards specified in the Basin Plan.

Section 13271 (Discharge Notification)

CWC section 13271 requires any person who, without regard to intent or negligence, causes or permits any hazardous substance or sewage to be discharged in or on any waters of the state, or discharge or deposited where it is, or probably would be, discharged in or on any waters of the state to notify the Office of Emergency Services (OES) of the discharge as specified in that section. The OES then immediately notifies the appropriate regional board and the local health officer and administrator of environmental health of the discharge.

Section 13550

“The Legislature hereby finds and declares that the use of potable domestic water for non-potable uses, including, but not limited to, cemeteries, golf courses, parks, highway, landscaped areas, and industrial and irrigation uses, is a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution if recycled water is available which meets all of the following conditions, as determined by the State Board." This section requires the use of recycled water for industrial purposes subject to recycled water being available and upon a number of criteria including: provisions that the quality and quantity of the recycled water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and the use would not impact downstream users or biological resources.

Section 13551

This section prohibits a person or public agency, including a State agency, city, county, city and county, district, or any other political subdivision of the State, shall not use water from any source of quality suitable for potable domestic use for non-potable uses if suitable recycled water is available as provided in Section 13550.

Section 13571

Requires that anyone who constructs, alters, or destroys a water well, cathodic protection well, groundwater monitoring well, or geothermal heat exchange well, file a well completion report with the DWR. With no nearby sources of water available and no existing water supply wells on the Project site, a water supply well and groundwater monitoring wells would be constructed at the Site. These wells are required as part of the evaluation of water resources for the project. A well completion report would be filed with DWR for each well that is constructed. Measures would be undertaken to protect the groundwater wells (whether for water supply or for monitoring purposes) on the project site through the use of physical barriers (e.g., fencing, traffic bollards, etc.). In the event that an existing well is altered or destroyed, a well completion report would be filed with the DWR.

California Code of Regulations

Title 22, Article 3, Sections 64400.80 through 64445

This section requires monitoring for potable water wells, defined as non-transient, non-community water systems (serving 25 people or more for more than six months); the project would employ approximately 130 workers during operations. Regulated wells must be sampled for bacteriological quality once a month and the results submitted to the California Department of Public Health (CDPH) for review and comment. The wells must also be monitored for inorganic chemicals once and organic chemicals quarterly during the year designated with the year designation based on historical monitoring frequency and laboratory capacity. Condition of Certification **SOIL&WATER-18** was proposed to ensure the applicant complies with this requirement. However, the Modified BSPP does not meet the requirements for non-transient, non-community water systems because it would not have 25 people or more for six months or longer on the project site. As such Condition of Certification **SOIL&WATER-18** is no longer needed for the project and hence staff proposes that it be deleted. However, to ensure that the water quality of the pumped water is suitable for the intended uses, the well construction and operation should be conducted in accordance to Riverside County regulations discussed below under Riverside Country Ordinance Code Title 13, Chapter 13.20-Water Wells discussed below.

Title 23, Division 3, Chapter 9

This chapter requires the CRBRWQCB to issue a report of waste discharge for discharges of waste to land pursuant to the Water Code. The report requires submittal of information regarding the proposed discharge and waste management unit design and monitoring program. WDRs issued by the CRBRWQCB provide construction and monitoring requirements for the proposed discharge. The SWRCB has adopted general waste discharge requirements (97-10-DWQ) for discharge to land by small domestic wastewater treatment systems.

Title 23, Division 3, Chapter 15

This chapter regulates all discharges of hazardous waste to land that may affect water quality. Chapter 15 broadly defines a waste management area as “an area of land, or a portion of a waste management facility, at which waste is discharged.” Therefore, unless exempted, all discharges of hazardous waste to land that may affect water quality are regulated by Chapter 15. This chapter outlines siting, construction and monitoring requirements for waste discharges to land for landfills, surface impoundments, land treatment units, and waste piles. The chapter provides closure and post-closure maintenance and monitoring requirements for surface impoundments that are applicable to the project.

Title 27, Section 2000 et seq. and Title 23, Section 2510 et seq.

These sections include requirements for siting and minimum waste management standards for discharges of waste to land, and establish monitoring and corrective action requirements for discharges to land, including spills and leaks and other unauthorized discharges. These sections also require assurances of financial responsibility for closure and post-closure activities and corrective actions for all known or reasonably foreseeable releases.

State Water Resources Control Board Policies

Anti-Degradation Policy (Resolution No. 68-16)

Requires the CRBRWQCB, in regulating the discharge of waste, to: (a) maintain existing high quality waters of the State until it is demonstrated that any change in quality would be consistent with maximum benefit to the people of the State, would not unreasonably affect present and anticipated beneficial uses, and would not result in water quality less than that described in State or Regional Water Boards policies; and (b) require that any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters, must meet waste discharge requirements which would result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance would not occur and b) the highest water quality consistent with maximum benefit to the people of the State would be maintained.

Water Reclamation Policy (Resolution No. 77-01)

Under this policy, the SWRCB and CRBRWQCB shall encourage reclamation and reuse of water in water-short areas. Reclaimed water would replace or supplement the use of fresh water or better quality water.

Sources of Drinking Water Policy (Resolution No. 88-63)

This policy designates all groundwater and surface waters of the States as drinking water, except where: (a) the total dissolved solids are greater than 3,000 mg/L, (b) the well yield is less than 200 gpd from a single well, (c) the water is a geothermal resource, or in a water conveyance facility, or (d) the water cannot reasonably be treated for domestic use using either best management practices or best economically achievable treatment practices.

Policies and Procedures for Investigations and Clean-up and Abatement of Discharges under CWC Section 13304 (Resolution No. 92-49)

This policy establishes requirements for investigation and cleanup and abatement of discharges. Under this policy, clean-up and abatement actions are to implement applicable provisions of Title 23 CCR Chapter 15, to the extent feasible. The policy also requires the application of Section 2550.4 of Chapter 15 when approving any alternative cleanup levels less stringent than background. It requires remediation of the groundwater to the lowest concentration levels of constituents technically and economically feasible, which must be at least protect the beneficial uses of groundwater, but need not be more stringent than is necessary to achieve background levels of the constituents in groundwater.

Water Quality Control Policy for Recycled Water (Resolution No. 2009-0011)

The Recycled Water Policy was adopted to promote sustainable local water supplies. The purpose of this Policy is to increase the use of recycled water from municipal wastewater sources that meets the definition in CWC Section 13050(n), in a manner that implements state and Federal water quality laws.

Public Resources Code

Project Compliance with State Water Policy

The Energy Commission has six sources for statements of policy relating to water use in California applicable to power plants. The primary issues in all of these statements concerns the use of fresh water to cool power plants. Given the use of PV technology the Modified BSPP would not be contrary to any policy on the use of water for cooling. The statements are the California Constitution, the Warren-Alquist Act, the Commission's restatement of the state's water policy in the 2003 Integrated Energy Policy Report ("IEPR"), the State Water Resources Control Board ("SWRCB" or "Board") resolutions (in particular Resolutions 75-58 and 88-63), a letter from the Board to the Energy Commission interpreting Resolutions 75-58 and 88-63 (collectively referred to as the state's water policies), and the Genesis Solar Project Committee's water-issues order as guidance for interpreting all of the above.

California Constitution

California's interest in conserving water is so important to our thirsty state that in 1928, the common law doctrine of reasonable use became part of the state Constitution. Article X, section 2 calls for water to be put to beneficial use, and that "waste or unreasonable use or unreasonable *method of use* be prevented." (Cal. Const., art. X, § 2; emphasis added.) The article also limits water rights to reasonable use, including reasonable methods of use. (*Ibid*.) Even earlier in the 20th Century, a state Supreme Court case firmly established that groundwater is subject to reasonable use. (*Katz v. Walkinshaw* (1903) 141 Cal. 116.) Thus, as modern technology has made dry-cooling of power plants feasible, the Energy Commission may regard wet-cooling as an unreasonable method of use of surface or groundwater, and even as a wasteful use of the state's most precious resource.

Warren-Alquist Act

Section 25008 of the Energy Commission's enabling statutes echoes the Constitutional concern, by promoting "all feasible means" of water conservation and "all feasible uses" of alternative water supply sources. (Pub. Resources Code § 25008.)

Integrated Energy Policy Report

In the 2003 Integrated Energy Policy Report ("IEPR" or "Report"), the Energy Commission reiterated certain principles from SWRCB's Resolution 75-58, discussed below, and clarified how they would be used to discourage use of fresh water for cooling power plants under the Energy Commission's jurisdiction. Because the modified BSPP will not require any cooling method the 2003 IEPR is not applicable.

State Water Resources Control Board Resolutions

The SWRCB not only considers quantity of water in its resolutions, but also the quality of water. In 1975, the Board determined that water with TDS of 1,000 mg/L or less should be considered fresh water. (Resolution 75-58.) One express purpose of that Resolution was to "keep the consumptive use of fresh water for powerplant cooling to that *minimally essential*" for the welfare of the state. (*Ibid*; emphasis added.) In 1988, the Board determined that water with TDS of 3,000 mg/L or less should be protected for and considered as water for municipal or domestic use. (Resolution 88-63.)

When evaluating solar projects, staff was unsure exactly how to integrate these decisions for water with TDS between 1,000 and 3,000 mg/L. In November, 2009, staff requested direct help from the Board for a contemporary interpretation of those Resolutions. (Letter from Executive Director Melissa Jones to SWRCB Executive Director Dorothy Rice, Nov. 23, 2009.) The Board responded with a letter.

Letter from the State Water Resources Control Board

The Board's response first established that, generally, Commission staff should consider "multiple factors" in its decisions regarding water supplies for power plants. (Letter from SWRCB Executive Director Dorothy Rice to then Executive Director Melissa Jones, Jan. 20, 2010 "SWRCB Letter.") In other words, staff should consider the impacts on the relevant basin, impacts on other basins, the quantity of use proposed, the quality of the water proposed for use, the project's requirements as understood by staff, whether there are any other competing uses for the water supply, and other relevant factors when analyzing a proposed project's water use. The letter also confirmed that both Board Resolutions are binding on all state agencies. (Wat. Code § 13146.)

In addressing water of TDS of 1,000 to 3000 mg/L, the Board stated that such water should be generally considered fresh when it involves surface water, and generally not when it involves groundwater. (SWRCB Letter, p. 3.) The Board concluded that groundwater should only be used for renewable energy power plants "upon a demonstration that the use of other water supplies or *other methods of cooling* would be 'environmentally undesirable or economically unsound.'" (*Ibid*; emphasis added.) While the Board did not define "economically unsound," it explained that the Water Code compels use of recycled water for industrial uses if recycled water is available, and its cost is equal to or less expensive than using fresh water. (*Id*. at p. 4; see Wat. Code § 13550). The staff also notes that dry-cooling has been amply demonstrated to be feasible and, thus, a potential method of cooling that could avoid the use of groundwater in accordance with the Board's letter.

The technology that would be used by the Modified BSPP does not require use of water for cooling purposes. Groundwater is the only available source of water. Pumped water would be used for various purposes, including domestic use by workers, dust suppression, and solar panel washing. Water is the only feasible means of cleaning the solar panels, which must be clean to maintain efficiency of output by PV solar plants. In addition the project would include recycling of RO reject wastewater to optimize water use efficiency. Overall use of the water is efficient for this technology, requiring less than 8 afy per 100 MW of capacity, or 0.01 acre feet per gigawatt hour (GW)-hour generated.

Quality of the groundwater varies significantly throughout the PVMGB, and varies with depth. In general, groundwater below the project site would not meet water quality standards for domestic supply without treatment because of elevated levels of TDS and high concentrations of fluoride, chloride, boron, and sulfate.

Staff concludes that the project complies with the state's water policy to feasibly use the least amount of the lowest-quality water available. For staff's complete analysis of related water issues for the project, please see the **Assessment of Impacts and Discussion of Mitigation** section of this Staff Assessment.

The administering agencies for the State LORS are the Energy Commission, the SWRCB, and the CRBRWQCB. The project would comply with the applicable State LORS related to water use and quality during construction and operation.

Regional and Local

Riverside County Ordinance Code, Title 13, Chapter 13.20 – Water Wells

Section 13-.20.160 Well Logs

This section requires that a report of well excavation for all wells dug or bored for which a permit has been issued be submitted to the Riverside County Department of Environmental Health within 60 days after completion of drilling. DWR Form 188 shall satisfy this requirement as stipulated under California Water Code Section 13571.

Section 13.20.190 Water Quality Standards

This section requires that water from wells that provide water for beneficial use shall be tested for radiological, bacteriological and chemical contamination as indicated by the Riverside County Department of Environmental Health to ensure water quality meets the standards for the intended use. Laboratory testing must be performed by a State of California-certified laboratory. The results of the testing are to be provided to the County Department of Environmental Health within 90 days of pump installation. Condition of Certification **SOIL&WATER-3** was proposed to ensure the applicant complies with this requirement.

Section 13.20.220 Well Abandonment

This section provides that all abandoned wells shall be destroyed in such a way that they would not produce water or act as a channel for the interchange of water, and would not present a hazard to the safety and well-being of people or animals. Destruction of any well shall follow requirements stipulated in DWR Bulletin No.74-81, provided that at a minimum the top 50 feet shall be sealed with concrete, or other approved sealing material. Applications for well destruction must be submitted 90 days following abandonment of the well and in accordance with Section 14.08.170.

Section 13.20.240 Declaration of Proposed Reuse

Requires that any well that has not been used for a period of one (1) year shall be properly destroyed unless the owner has filled a “Notice of Intent” with the health officer declaring the well out of service and declaring his intention to use the well again.

Riverside County Ordinance Code, Title 8, Chapter 8.124 - Sewage Discharge

With respect to onsite wastewater discharge, the CRBRWQCB adopted in 1984 “Guidelines for Sewage Disposal from Land Developments” that provides exclusion of on-site sanitary wastewater flows less than 5,000 gpd. Correspondingly, since each Power Unit will have a sanitary wastewater disposal system with a maximum capacity of 2,750 gpd the exclusion applies and the sanitary wastewater disposal system will be designed in accordance with County of Riverside requirements.

Section 8.124.030, General Requirements for an Approval and Construction Permit

The type, capacity, location, and layout of each private system shall comply with the rules and regulations of the health officer, and the WDRs of the CRBRWQCB. A private system shall be constructed and maintained on the lot which is the site of the building it serves, unless the health officer in his discretion authorizes a different location.

Section 8.124.050 Operation Permits

Each private system shall be managed, cleaned, regulated, repaired, modified and replaced from time to time by the owner or owner’s representatives, in accordance with the rules, regulations and other reasonable requirements of the health officer in conformity with the WDR of the regional board and in a manner which would safeguard against and prevent pollution, contamination or nuisance.

Riverside County Title 15 Chapter 15, 24 Uniform Plumbing Code

Section 15.24.010. Adopted by Reference, Appendix K, Section K1 amended – Private Sewage Disposal – General

In certain areas of the County which have poor soils or other problems relative to sewage disposal, the sewage disposal system shall be installed and inspected before the building foundation inspection is made.

Section 15.24.010. Adopted by Reference, Appendix K, Section K6(i) amended – Disposal fields

Disposal fields, trenches, and leaching beds shall not be paved over or covered by concrete or any material that can reduce or inhibit any possible evaporation of the sewer effluent unless the area of the disposal fields, trenches, and leaching beds is increased by a minimum of 25 percent.

Riverside County Title 15 Chapter 15.80 Regulating Flood Hazard Areas and Implementing the National Flood Insurance Program

This ordinance was developed to comply with Title 44 CFR Part 65 regarding requirements for the identification and mapping of areas identified as FEMA Special Flood Hazard Areas. The ordinance is applicable to development within unincorporated areas of Riverside County and is integrated into the process of application for development permits under other county ordinances including, but not limited to, Ordinance Nos. 348, 369, 457, 460, and 555. When the information required, or procedures involved, in the processing of such applications is not sufficient to assure compliance with the requirements of Chapter 15.80, a separate application must be filed.

Flood insurance rate maps for the project site or surrounding areas have not been prepared by FEMA. According to the Riverside County General Plan (Riverside County, 2000) the project site and surrounding lands do not lie within a 100-year or 500-year flood plain.

NOTEWORTHY PUBLIC BENEFITS

No noteworthy public benefits of the proposed project were identified associated with soil and water resources.

RESPONSE TO PUBLIC COMMENTS

No comments have been received for the Modified BSPP related to Soil and Water.

CONCLUSIONS

Staff’s conclusions based on analysis of the information submitted are as follows:

1. The Modified BSPP would be located on an alluvial fan where flash flooding and mass erosion could impact the project. Project-related changes to the alluvial fan hydrology could result in impacts to adjacent land users. A DESCP has been developed to mitigate the potential storm water and sediment project-related

impacts. However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts are not exact as they depend on how accurately model parameters and boundary conditions are represented, and as such have limitations and uncertainties associated with them. Given the uncertainty associated with the simulated results, the magnitude of potential impacts that could occur cannot be determined precisely. Based on these factors, the Modified BSPP could result in impacts that would be significant with respect to CEQA significance criteria specified herein. Therefore, conditions of certification have been developed that define the requirements for reports, plans, monitoring, and inspection, as well as standards and procedures for implementing BMPs during construction and operation phases. These conditions of certification are included in **SOIL&WATER-1**, and **-11.**

2. The Modified BSPP would have an impact on groundwater levels in the PVMGB. However, the calculations and assumptions used to evaluate potential groundwater level impacts are imprecise as they depend on how accurately model parameters and boundary conditions are represented, and thus have limitations and uncertainties associated with them. Given the uncertainty associated with the calculations, the magnitude of potential impacts that could occur cannot be determined precisely. To ensure that the project's proposed use of groundwater does not significantly impact the beneficial uses and users of the groundwater in the PVMGB, staff believes the project owner should be required to develop a monitoring, mitigation, and reporting program and identify what changes will be occurring in basin water levels during project construction and operation. Substantial changes to groundwater levels caused by the Modified BSPP and other pumping in the basin would be documented by this monitoring, mitigation, and reporting program in accordance with Conditions of Certification **SOIL&WATER-3**, **-4**, **-5,** and **-6**.

3. The impact analysis indicates that groundwater extraction during construction and operation of this and other foreseeable projects has the potential to place the basin into a condition of overdraft. The potential overdraft condition will not have a significant impact on the basin storage of the PVMGB and is considered insignificant. However, the analysis of the project owner's proposed water use suggests that groundwater withdrawn from production wells is located within a groundwater basin that is tributary to the Colorado River and that project pumping may induce flows from the Colorado River. This impact may be exacerbated by other unidentified renewable energy projects in the I-10 corridor, which has been targeted as a potential area for further renewable energy development. To mitigate the project's potential contribution to impacts to the Colorado River, the applicant should be required to comply with Condition of Certification **SOIL&WATER-2** which would require acquisition of offsets to Lower Colorado River water**.** Staff has also proposed Condition of Certification **SOIL&WATER-16** which allows the project owner to refine estimates of the amount of subsurface water flowing from the Colorado River due to project pumping through numerical analysis and further determine the required acquisition of offsets to Lower Colorado River water.

4. The Modified BSPP will use up to 40 afy of groundwater from onsite wells. Groundwater is the only available source of water. Pumped water would be used

for various purposes, including domestic use by workers, dust suppression, and solar panel washing. Water is the only feasible means of cleaning the solar panel, which must be clean to maintain efficiency of output by the solar panels used in the solar plant.

5. Overall use of the water is efficient for this technology, requiring less than 8 afy per 100 MW of capacity, or less than 0.01 acre-foot per GW-hour generated.

6. Quality of the groundwater varies significantly throughout the PVMGB, and also varies with depth within the aquifer. In general, groundwater under the project site would not meet water quality standards for domestic supply without treatment because of elevated levels of TDS and high concentrations of fluoride, chloride, boron, and sulfate. Staff concludes that the Modified BSPP complies with the state's water policy to feasibly use the least amount of the lowest quality water available.

7. The Modified BSPP will generate wastewater that will include RO reject water, and sanitary wastewater. The project proposes to use evaporation ponds to treat the RO reject water and a sanitary leach field to treat the sanitary wastewater. Proposed Conditions of Certification **SOIL&WATER-7** and **SOIL&WATER-8** will ensure that the operation of the wastewater treatment systems are in accordance with regulatory requirements and minimize potential impacts to surface and groundwater quality. In addition, proposed Condition of Certification **SOIL&WATER-17** will monitor existing groundwater quality to monitor compliance with the requirements set forth in conditions of certification **SOIL&WATER-7** and **SOIL&WATER-8.**

PROPOSED CONDITIONS OF CERTIFICATION

Staff has proposed modifications to the **Soil & Water Resources** Conditions of Certification as shown below. (**Note:** Deleted text is in ~~strikethrough~~, new text is **<u>bold and underlined</u>**).

DRAINAGE EROSION AND SEDIMENTATION CONTROL PLAN (DESCP)

SOIL&WATER-1: Prior to site mobilization, the project owner shall obtain ~~both~~ the ~~BLM's Authorized Officer (AO) and~~ Compliance Project Manager (CPM) approval of the Drainage Erosion and Sedimentation Control Plan (DESCP) for managing stormwater during Project construction and operations as normally administered by the County of Riverside. The DESCP must ensure proper protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, include provisions for sediment and stormwater retention from both the power block, solar fields and transmission right of way to meet any Riverside County requirements, address exposed soil treatments in the solar fields for both road and non-road surfaces, and identify all monitoring and maintenance activities. The DESCP shall contain, at minimum, the elements presented below that outline site management activities and erosion and sediment-control Best Management Practices

(BMP) to be implemented during site mobilization, excavation, construction, and post construction (operating) activities.

A. **Vicinity Map** – A map(s), at a minimum scale 1 inch to 500 feet, shall be provided indicating the location of all project elements (construction sites, laydown area, pipelines) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

B. **Site Delineation** – All areas subject to soil disturbance for the proposed project (project phases, laydown area, all linear facilities, landscaping areas, and any other project elements) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

C. **Watercourses and Critical Areas** – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. It shall indicate the proximity of those features to the ~~proposed~~ ~~P~~**p**roject construction, laydown, and landscape areas and all transmission and pipeline construction corridors. **Furthermore, earthwork and temporary construction related activities shall be conducted such that off-site resources are protected from impacts due to redirection of flood flows around and through the site. Construction activities shall proceed in a manner so as to minimize exposure of facilities to construction period flooding. Any temporary diversion channels shall be adequately designed for flood conveyance capable of protecting the construction site while not contributing to on-site or off-site erosion.**

D. **Drainage Map** – The DESCP shall provide a topographic site map(s), at a minimum scale of 1 inch to 200 feet, showing existing, interim, and proposed drainage swales and drainage systems and drainage-area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet.

E. **Drainage of Project Site Narrative** – The DESCP shall include a narrative of the drainage measures necessary to protect the site and potentially affected soil and water resources within the drainage downstream of the site. The narrative shall include the summary pages from the hydraulic analysis prepared by a professional engineer and erosion control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage features.

F. **Clearing and Grading Plans** – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography shall be illustrated by tying in proposed contours with existing topography.

G. **Clearing and Grading Narrative** – The DESCP shall include a table with the estimated quantities of material excavated or filled for the site and all project elements (project site, laydown area, transmission and pipeline corridors, roadways, and bridges) whether such excavation or fill is temporary or permanent, and the amount of such material to be imported or exported.

H. **Soil Wind and Water Erosion Control -** The plan shall address exposed soil treatments to be used during construction and operation of the proposed project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed project site that would not cause adverse effects to vegetation. BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by ~~both~~ the ~~AO and~~ CPM prior to use.

I. **Best Management Practices Plan –** The DESCP shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading, Project element excavation and construction, and final grading/stabilization). BMPs shall include measures designed to control dust, stabilize construction access roads and entrances, and control storm water runoff and sediment transport.

J. **Best Management Practices Narrative –** The DESCP shall show the location (as identified in (I) above), timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during all Project element (site, pipelines) excavations and construction, final grading/stabilization, and operation. Separate BMP implementation schedules shall be provided for each Project element for each phase of construction. The maintenance schedule shall include post-construction maintenance of structural-control BMPs, or a statement provided about when such information would be available.

K. **Project Schedule –** The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, Project element construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each Project element for each phase of construction.

L. **Erosion Control Drawings –** The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion control specialist.

M. **Agency Comments –** The DESCP shall include copies of recommendations, conditions, and provisions from the California Department of Fish and Game (CDFG) and Colorado River Basin Regional Water Quality Control Board (CRBWQCB).

N. **Monitoring Plan:** Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches~~, and storm water diversions~~. ~~The monitoring plan shall be part of the Channel Maintenance Program,~~ ~~**SOIL&WATER-15.**~~

Verification: No later than thirty (30) days prior to start of site mobilization, the project owner shall submit a copy of the final DESCP to the ~~AO and~~ CPM for review and comment and to the County of Riverside and the CRBWQCB if required. ~~Both~~ the ~~AO and~~ CPM shall consider comments if received by the county and CRBRWQCB before approval of the DESCP.

The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and relevant portions of the DESCP shall clearly show approval by the chief building official. The DESCP shall be a separate plan from the SWPPP developed in conjunction with any National Pollution Discharge Elimination System (NPDES) permit for Construction Activity.

The project owner shall provide in the Monthly Compliance Report with a narrative on the effectiveness of the drainage, erosion, and sediment-control measures and the results of monitoring and maintenance activities.

Once operational, the project owner shall update and maintain the DESCP for the life of the project and shall provide in the annual compliance report information on the results of monitoring and maintenance activities.

MITIGATION OF COLORADO RIVER IMPACTS

SOIL&WATER-2: The project owner shall undertake one or more of the activities identified below to mitigate project impacts to flows in the Colorado River. These activities shall result in replacement of up to ~~22,100~~**2,400** af (~~4,100~~**1,200** af during the construction period and ~~600~~**40** afy during 30 years of operation) in the Colorado River Basin over the life of the project. The activities shall include water conservation projects such as payment for irrigation improvements in Palo Verde Irrigation District, purchase of water rights within the Colorado River Basin that will be held in reserve, and/or BLM's Tamarisk Removal Program or other proposed mitigation activities acceptable to the CPM.

The activities proposed for mitigation shall be outlined in a Water Supply Plan that shall be provided to the CPM for review and approval.

The project owner can choose to further evaluate the quantity of water attributed to flow from the Colorado River by implementing **SOIL&WATER-16** and determining what volume of water shall be mitigated consistent with this Condition of Certification.

Verification: The project Owner shall submit a Water Supply Plan to the CPM for review and approval thirty (30) days before the start of extraction of groundwater for construction or operation. The Water Supply Plan shall include the following at a minimum:

- Identification of the activities and water source that will replace up to ~~22,100~~**2,400** af or other quantity as determined in **SOIL&WATER-16** diverted from the Colorado River over the life of the project;
- Demonstration of the Project owner's legal right to the water or ability to conduct the activity;

- Discuss whether any governmental approval of the identified activities will be needed, and if so, whether additional approval will require compliance with CEQA or NEPA;
- Demonstration of how much Colorado River water each of the chosen activities replaces;
- An estimated schedule for completion of the activities;
- Performance measures that would be used to evaluate the amount of water replaced by the activities;
- Monitoring and Reporting Plan outlining the steps necessary and proposed frequency of reporting to show the activities are achieving the intended benefits and replacing Colorado River diversions; and
- If the application for allocation from the Colorado River is accepted by the USBR, the project owner shall submit to ~~both AO and~~ the CPM for their approval, a copy of a water allocation from the Colorado River issued by the CRB for the Project's diversion of Colorado River water.

The project owner shall implement the activities reviewed and approved in the Water Supply Plan in accordance with the agreed upon schedule in the Water Supply Plan. If agreement on identification or implementation of mitigation activities cannot be achieved the project owner shall immediately halt construction or operation until assurance that the agreed upon activities can be identified and implemented.

PROJECT GROUNDWATER WELLS, PRE-WELL INSTALLATION

SOIL&WATER-3: The project owner proposes to construct and operate up to ~~ten (10)~~ **<u>three (3)</u>** onsite groundwater supply wells that produce water from the Palo Verde Mesa Groundwater Basin (PVMGB). The project owner shall ensure that the wells are completed in accordance with all applicable state and local water well construction permits and requirements. Prior to initiation of well construction activities, the project owner shall submit for review and comment a well construction packet to the County of Riverside and fees normally required for the county's well permit, with copies to ~~both~~ the ~~AO and~~ CPM. The project shall not construct a well or extract and use groundwater until a permit has been issued by the County and ~~both~~ the ~~AO and~~ CPM provide approval to construct and operate the well. Wells permitted and installed as part of pre-construction field investigations that subsequently are planned for use as project water supply wells require ~~AO and~~ CPM approval prior to their use to supply water to the project.

Post-Well Installation. The project owner shall provide documentation as required under County permit conditions to ~~both~~ the ~~AO and~~ CPM that the well has been properly completed. In accordance with California's Water Code section 13754, the driller of the well shall submit to the DWR a Well Completion Report for each well installed. The project owner shall ensure the Well Completion reports are submitted. The project owner shall ensure compliance with all county water well standards the County permit requirements for the life of the wells and shall provide the ~~AO and~~ CPM with two (2) copies each of all monitoring or other reports required for compliance with the County of Riverside water well standards and operation requirements, as well as any changes made to the operation of the well.

Verification: The project owner shall do all of the following:

a. No later than sixty (60) days prior to the construction of the onsite groundwater production wells, the project owner shall submit to ~~both~~ the ~~AO and~~ CPM a copy of the water well construction packet submitted to the County of Riverside.

b. No later than thirty (30) days prior to the construction of the onsite groundwater production wells, the project owner shall submit a copy of written concurrence received from the County of Riverside that the proposed well construction activities comply with all county well requirements and meet the requirements established by the county's water well permit program. The ~~AO and~~ CPM shall provide approval to the project owner of the well location and operation within ten (10) days of receipt of the well permit.

c. No later than sixty (60) days after installation of each well at the Project site, the project owner shall ensure that the well driller submits a Well Completion Report to the DWR with a copy provided to ~~both~~ the ~~AO and~~ CPM. The project owner shall submit to ~~both~~ the ~~AO and~~ CPM together with the Well Completion Report a copy of well drilling logs, water quality analyses, and any inspection reports. Additionally no later than sixty (60) days after installation of each well the ~~P~~**p**roject owner shall submit documentation to the ~~AO,~~ CPM~~,~~ and the CRBRWQCB that well drilling activities were conducted in compliance with Title 23, California Code of Regulations, Chapter 15, Discharges of Hazardous Wastes to Land, (23 CCR, sections 2510 et seq.) and that any onsite drilling sumps used for Project drilling activities were removed in compliance with 23 CCR section 2511(c)

d. During well construction and for the operational life of the well, the project owner shall submit two copies each to the ~~AO and~~ CPM of any proposed well construction or operation permit changes within ten (10) days of submittal to or receipt from the County of Riverside.

CONSTRUCTION AND OPERATION WATER USE

SOIL&WATER-4: The proposed Project's use of groundwater during construction shall not exceed ~~4,100 af~~ **1,200 AF** during the ~~69~~ **48** months of construction and an annual average of ~~600 afy~~ **40 AFY** during operation**.** ~~or a total amount of 22,100 acre feet (over the Project life).~~ Water quality used for project construction and operation will be reported in accordance with Condition of Certification **SOIL&WATER-17** to ensure compliance with this condition.

Prior to the use of groundwater for construction, the project owner shall install and maintain metering devices as part of the water supply and distribution system to document Project water use and to monitor and record, in gallons per day, the total volume(s) of water supplied to the Project from this water source. The metering devices shall be operational for the life of the Project.

Verification: At least sixty (60) days prior to the start of construction of the proposed project, the project owner shall submit to ~~both~~ the ~~AO and~~ CPM a copy of evidence that metering devices have been installed and are operational.

Beginning six months after the start of construction, the project owner shall prepare a semi-annual summary of amount of water used for construction purposes. The summary shall include the monthly range and monthly average of daily water usage in gallons per day.

The project owner shall prepare an annual summary, which shall include daily usage, monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary shall also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal.

GROUNDWATER LEVEL MONITORING, MITIGATION, AND REPORTING PLAN

SOIL&WATER-5: The project owner shall submit a Groundwater Level Monitoring, Mitigation, and Reporting Plan to ~~both~~ the ~~AO and~~ CPM for review and approval in advance of construction activities and prior to the operation of onsite groundwater supply wells. The Groundwater Level Monitoring, Mitigation, and Reporting Plan shall provide detailed methodology for monitoring background and site groundwater levels. Monitoring shall include pre-construction, construction, and project operation water use. The plan shall establish pre-construction and project related groundwater level trends that can be quantitatively compared against observed trends near the project pumping wells and near potentially impacted existing wells.

A. Prior to Project Construction

1. A well reconnaissance shall be conducted to investigate and document the condition of existing water supply wells located within 5 miles of the project site, provided that access is granted by the well owners. The reconnaissance shall include sending notices by registered mail to all property owners within a 5 mile radius of the project area.
2. Monitor to establish preconstruction conditions. The monitoring plan and network of monitoring wells shall make use of existing wells in the basin that would satisfy the requirements for the monitoring program. The monitoring network shall be defined by the groundwater model developed for the AFC as the area predicted to show a water level change of 1 feet or more at the end of construction and at the end of operation and any monitoring wells that are installed to comply with Waste Discharge Requirements issued by the Energy Commission for the evaporation ponds and land treatment unit associated with the project. Identified additional wells will be located outside of this area to serve as background monitoring wells. Abandoned wells, or wells no longer in use, that are accessible and provide reliable water level data within the potentially impacted area may also be included as part of the monitoring network. A site reconnaissance will be performed to identify wells that could be accessible for monitoring. As access to these wells is available, historic water level, water quality, well construction and

well performance information shall be obtained for both pumping and non-pumping conditions.

3. As access allows, measure groundwater levels from the off-site and on-site wells within the network and background wells to provide initial groundwater levels for pre-project trend analysis.
4. Construct water level maps within the PVMGB within 5 miles of the site from the groundwater data collected prior to construction. Update trend plots and statistical analyses, as data is available.

B. During Construction:

1. Collect water levels within the monitoring network on a quarterly basis throughout the construction period and at the end of the construction period. Perform statistical trend analysis for water levels. Assess the significance of an apparent trend and estimate the magnitude of that trend.

C. During Operation:

1. On a quarterly basis for the first year of operation and semi-annually thereafter for the following four years, collect water level measurements from any wells identified in the groundwater monitoring program to evaluate operational influence from the project. Quarterly operational parameters (i.e., pumping rate) of the water supply wells shall be monitored. Additionally, quarterly groundwater-use in the PVMGB shall be estimated based on available data.
2. On an annual basis, perform statistical trend analysis for water levels data and comparison to predicted water level declines due to project pumping. Analysis of the significance of an apparent trend shall be determined and the magnitude of that trend estimated. Based on the results of the statistical trend analyses and comparison to predicted water level declines due to project pumping, the project owner shall determine the area where the project pumping has induced a drawdown in the water supply at a level of 5 feet or more below the baseline trend.
3. If water levels have been lowered more than 5 feet below pre-site operational trends, and monitoring data provided by the project owner show these water level changes are different from background trends and are caused by project pumping, then the project owner shall provide mitigation to the impacted well owner(s). Mitigation shall be provided to the impacted well owners that experience 5 feet or more of Project-induced drawdown if the ~~both the AO and~~ CPM's inspection of the well monitoring data confirms changes to water levels and water level trends relative to measured pre-project water levels, and the well (private owners well in question) yield or performance has been significantly affected by project pumping. The type and extent of mitigation shall be determined by the amount of water level decline induced by the project, the type of impact, and site specific well construction and water use characteristics. If an impact is determined

to be caused by drawdown from more than one source, the level of mitigation provided shall be proportional to the amount of drawdown induced by the project relative to other sources. In order to be eligible, a well owner must provide documentation of the well location and construction, including pump intake depth, and that the well was constructed and usable before project pumping was initiated. The mitigation of impacts shall be determined as follows:

a. If project pumping has lowered water levels by 5 feet or more and increased pumping lifts, increased energy costs shall be calculated. Payment or reimbursement for the increased costs shall be provided at the option of the affected well owner on an annual basis. In the absence of specific electrical use data supplied by the well owner, the project owner shall use Condition of Certification **SOIL&WATER-6** to calculate increased energy costs.

b. If groundwater monitoring data indicate project pumping has lowered water levels below the top of the well screen, and the well yield is shown to have decreased by 10 percent or more of the pre-Project average seasonal yield, compensation shall be provided for the diagnosis and maintenance to treat and remove encrustation from the well screen. Reimbursement shall be provided at an amount equal to the customary local cost of performing the necessary diagnosis and maintenance for well screen encrustation. Should the well yield reductions be recurring, the project owner shall provide payment or reimbursement for periodic maintenance throughout the life of the project. If with treatment the well yield is incapable of meeting 110 percent of the well owner's maximum daily demand, dry season demand, or annual demand the well owner should be compensated by reimbursement or well replacement as described under Condition of Certification **SOIL&WATER-3(c)**.

c. If project pumping has lowered water levels to significantly impact well yield so that it can no longer meet its intended purpose, causes the well to go dry, or cause casing collapse, payment or reimbursement of an amount equal to the cost of deepening or replacing the well shall be provided to accommodate these effects. Payment or reimbursement shall be at an amount equal to the customary local cost of deepening the existing well or constructing a new well of comparable design and yield (only deeper).. The demand for water, which determines the required well yield, shall be determined on a per well basis using well owner interviews and field verification of property conditions and water requirements compiled as part of the pre-project well reconnaissance. Well yield shall be considered significantly impacted if it is incapable of meeting 110 percent of the well owner's maximum daily demand, dry-season demand, or annual demand – assuming the pre-project well yield documented by the initial well reconnaissance met or exceeded these yield levels. For already low-yielding wells identified prior to project construction, a reduction due solely to project pumping of 10 percent or more below the pre-project yield shall be considered a significant impact. The contribution of project pumping to observed decreases in observed well yield shall be determined using the groundwater monitoring data collected.

d. The project owner shall notify any owners of the impacted wells within one month of ~~both~~ the ~~AO and~~ CPM approval of the compensation analysis for increased energy costs.

e. Pump lowering – In the event that groundwater is lowered as a result of project pumping to an extent where pumps are exposed but well screens remain submerged the pumps shall be lowered to maintain production in the well. The project shall reimburse the impacted well owner for the costs associated with lowering pumps.

f. Deepening of wells – If the groundwater is lowered enough as a result of project pumping that well screens and/or pump intakes are exposed, and pump lowering is not an option, such affected wells shall be deepened or new wells constructed. The project owner shall reimburse the impacted well owner for all costs associated with deepening existing wells or constructing new wells shall be borne by the project owner.

4. After the first five-year operational and monitoring period ~~both~~ the ~~AO and~~ CPM shall evaluate the data and determine if the monitoring program for water level measurements should be revised or eliminated. Revision or elimination of any monitoring program elements shall be based on the consistency of the data collected. The determination of whether the monitoring program should be revised or eliminated shall be made by the ~~both the AO and~~ CPM.

5. If mitigation includes monetary compensation, the project owner shall provide documentation to the ~~both the AO and~~ CPM that compensation payments have been made by March 31 of each year of project operation or, if lump-sum payment are made, payment is made by March 31 following the first year of operation only. Within thirty (30) days after compensation is paid, the project owner shall submit to the ~~both the AO and~~ CPM a compliance report describing compensation for increased energy costs necessary to comply with the provisions of this condition.

6. At the end of every subsequent five-year monitoring period, the collected data shall be evaluated by the ~~both the AO and~~ CPM and they shall determine if the sampling frequency should be revised or eliminated.

7. During the life of the project, the project owner shall provide to the ~~both the AO and~~ CPM all monitoring reports, complaints, studies and other relevant data within ten (10) days of being received by the Project owner.

Verification: The project owner shall do all of the following:

a. At least thirty (30) days prior to project construction, the project owner shall submit to the ~~both the AO and~~ CPM, a comprehensive report presenting all the data and information required in item A above. The ~~AO and~~ CPM will provide comments to the plan following submittal. ~~AO and~~ CPM approval of the plan is required prior to operation of the site groundwater supply wells. The project owner shall also submit to the ~~both~~ the ~~AO and~~ CPM all calculations and assumptions made in development of the report data and interpretations.

b. During project construction, the project owner shall submit to the ~~both the AO and~~ CPM quarterly reports presenting all the data and information required in item B above. The quarterly reports shall be provided thirty (30) days following the end of the quarter. The project owner shall also submit to the ~~both the AO and~~ CPM all calculations and assumptions made in development of the report data and interpretations.

c. No later than March 31 of each year of construction or sixty (60) days prior to project operation, the project owner shall provide to the ~~both the AO and~~ CPM for review and approval, documentation showing that any mitigation to private well owners during project construction was satisfied, based on the requirements of the property owner as determined by the ~~both the AO and~~ CPM.

d. During project operation, the project owner shall submit to the ~~both the AO and~~ CPM, applicable quarterly, semi-annual and annual reports presenting all the data and information required in item C above. Quarterly reports shall be submitted to the ~~AO and~~ CPM thirty (30) days following the end of the quarter. The fourth quarter report shall serve as the annual report and will be provided on January 31 in the following year.

e. The project owner shall submit to the ~~both the AO and~~ CPM all calculations and assumptions made in development of report data and interpretations, calculations, and assumptions used in development of any reports.

f. After the first five year operational and monitoring period, the project owner shall submit a 5-year monitoring report to ~~both~~ the ~~AO and~~ CPM that includes all monitoring data collected and a summary of the findings. ~~Both the AO and~~ **The** CPM will determine if the water level measurements and water quality sampling frequencies should be revised or eliminated.

SOIL&WATER-6: Where it is determined that the project owner shall reimburse a private well owner for increased energy costs identified as a result of analysis performed in Condition of Certification **SOIL&WATER-5,** the project owner shall calculate the compensation owed to any owner of an impacted well as described below.

<u>Increased cost for energy</u>	=	change in lift/total system head x total energy consumption x costs/unit of energy
Where:		
change in lift (ft)	=	calculated change in water level in the well resulting from project

total system head (ft)	=	elevation head + discharge pressure head
elevation head (ft)	=	difference in elevation between wellhead discharge pressure gauge and water level in well during pumping.
discharge pressure head (ft)	=	pressure at wellhead discharge gauge (psi) X 2.31

The project owner shall submit to the CPM for review and approval the documentation showing which well owners must be compensated for increased energy costs and that the proposed amount is sufficient compensation to comply with the provisions of this condition.

- Any reimbursements (either lump sum or annual) to impacted well owners shall be only to those well owners whose wells were in service within six months of the Commission decision and within a 5-mile radius of the project site.
- The project owner shall notify all owners of the impacted wells within one month of the CPM approval of the compensation analysis for increase energy costs.
- Compensation shall be provided on either a one-time lump-sum basis, or on an annual basis, as described below.

Annual Compensation: Compensation provided on an annual basis shall be calculated prospectively for each year by estimating energy costs that will be incurred to provide the additional lift required as a result of the project. With the permission of the impacted well owner, the project owner shall provide energy meters for each well or well field affected by the project. The impacted well owner to receive compensation must provide documentation of energy consumption in the form of meter readings or other verification of fuel consumption. For each year after the first year of operation, the project owner shall include an adjustment for any deviations between projected and actual energy costs for the previous calendar year.

One-Time Lump-Sum Compensation: Compensation provided on a one-time lump-sum basis shall be based on a well-interference analysis, assuming the maximum project-pumping rate of ~~600~~ **40** afy. Compensation associated with increased pumping lift for the life of the project shall be estimated as a lump sum payment as follows:

- The current cost of energy to the affected party considering time of use or tiers of energy cost applicable to the party's billing of electricity from the utility providing electric service, or a reasonable equivalent if the party independently generates their electricity;
- An annual inflation factor for energy cost of 3 percent; and
- A net present value determination assuming a term of 30 years and a discount rate of 9 percent;

Verification: The project owner shall do all of the following:

a. No later than thirty (30) days after CPM approval of the well drawdown analysis, the project owner shall submit to the CPM for review and approval all documentation and calculations describing necessary compensation for energy costs associated with additional lift requirements.
b. The project owner shall submit to the CPM all calculations, along with any letters signed by the well owners indicating agreement with the calculations, and the name and phone numbers of those well owners that do not agree with the calculations.

Compensation payments shall be made by March 31 of each year of project operation or, if lump-sum payment is selected, payment shall be made by March 31 of the first year of operation only. Within thirty (30) days after compensation is paid, the project owner shall submit to the CPM a compliance report describing compensation for increased energy costs necessary to comply with the provisions of this condition.

WASTE DISCHARGE REQUIREMENTS

SOIL&WATER-7: The project owner shall comply with the requirements specified in Appendix B, C, and D. These requirements relate to discharges, or potential discharges, of waste that could affect the quality of waters of the state, and were developed in consultation with staff of the State Water Resources Control Board and/or the applicable California Regional Water Quality Control Board (hereafter "Water Boards"). It is the Commission's intent that these requirements be enforceable by both the Commission and the Water Boards. In furtherance of that objective, the Commission hereby delegates the enforcement of these requirements, and associated monitoring, inspection and annual fee collection authority, to the Water Boards. Accordingly, the Commission and the Water Board shall confer with each other and coordinate, as needed, in the enforcement of the requirements. The project owner shall pay the annual waste discharge permit fee associated with this facility to the Water Boards. In addition, the Water Boards may "prescribe" these requirements as waste discharge requirements pursuant to Water Code Section 13263 solely for the purposes of enforcement, monitoring, inspection, and the assessment of annual fees, consistent with Public Resources Code Section 25531, subdivision (c)

Verification: No later than sixty (60) days prior to any wastewater or storm water discharge or use of land treatment units, the project owner shall provide documentation to the CPM, with copies to the CRRWQCB, demonstrating compliance with the WDRs established in Appendices C, D, and E. Any changes to the design, construction, or operation of the evaporation basins, treatment units, or storm water system shall be requested in writing to the CPM, with copies to the CRRWQCB, and approved by the CPM, in consultation with the CRRWQCB, prior to initiation of any changes. The project owner shall provide to the CPM, with copies to the CRRWQCB, all monitoring reports required by the WDRs, and fully explain any violations, exceedances, enforcement actions, or corrective actions related to construction or operation of the evaporation basins, treatment units, or storm water system.

SEPTIC SYSTEM AND LEACH FIELD REQUIREMENTS

SOIL&WATER-8: The project owner shall comply with the requirements of the County of Riverside Ordinance Code Title 8, Chapter 8.124 and the California Plumbing Code (California Code of Regulations Title 24, Part 5) regarding sanitary waste disposal facilities such as septic systems and leach fields. The septic system and leach fields shall be designed, operated, and maintained in a manner that ensures no deleterious impact to groundwater or surface water. Compliance shall include an engineering report on the septic system and leach field design, operation, maintenance, and loading impact to groundwater.

Verification: The project owner shall submit all necessary information and the appropriate fee to the County of Riverside and the CRBWQCB to ensure that the project has complied with county and state sanitary waste disposal facilities requirements. Written assessments prepared by the County of Riverside and the CRBRWQCB regarding the project's compliance with these requirements must be submitted to the ~~AO and~~ CPM for review and approval thirty (30) days prior to the start of power plant operation.

GROUNDWATER PRODUCTION REPORTING

SOIL&WATER-9: The Project is subject to the requirement of Water Code Sections 4999 et. seq. for reporting of groundwater production in excess of 25 acre feet per year.

Verification: The project owner shall file an annual "Notice of Extraction and Diversion of Water" with the SWRCB in accordance with Water Code Sections 4999 et. seq. The project owner shall include a copy of the filing in the annual compliance report.

FACILITY CLOSURE PLAN

SOIL&WATER-10: The project owner will prepare ~~a decommissioning plan~~ **both a Provisional Closure Plan and a Final Closure Plan** that will meet the requirements of the BLM. The project owner shall identify likely ~~decommissioning~~ **closure** scenarios and develop ~~specific decommissioning~~ **facility closure** plans **in accordance with COM-15 "Facility Closure Plans" of the General Conditions.** ~~for each scenario that will identify a~~ **A**ctions to be taken to avoid or mitigate long-term impacts related to water and wind erosion after **the facility's closure need to be identified** ~~decommissioning~~. Actions may include such measures as a **facility closure** ~~decommissioning~~ SWPPP, revegetation and restoration of disturbed areas, post-**closure** ~~decommissioning~~ maintenance, collection and disposal of project materials and chemicals, and access restrictions.

Verification: ~~At least sixty (60) days prior to the start of site mobilization or alternate date as agreed to with BLM, the project owner shall submit decommissioning plans~~ **One (1) year after initiating commercial operation, the project owner must submit a Provisional Closure Plan and cost estimate for permanent closure to the CPM for review and approval. Three (3) years prior to closing, the owner must submit a Final Closure Plan** to the ~~AO and~~ CPM for review and approval. The project owner shall amend these documents as necessary, with approval from the ~~AO and~~ CPM, should the ~~decommissioning~~ **facility closure** scenario change in the future.

REVISED PROJECT DRAINAGE REPORT AND PLANS

SOIL&WATER-11 The project owner shall provide a revised Drainage Report which includes the following additional information:

A. A detailed explanation of the large differences in pre- and post-project peak discharges and flood volumes along the downstream (east) project boundary ~~as currently indicated by the HEC-HMS results~~.

B. Pre- and post development drainage maps which include the following information:

1. All topographic data used to establish the overall watershed boundaries as well as the sub-basin boundaries.
2. ~~A delineation of all onsite watersheds with basin areas, points of concentration, and peak discharge values where the smaller onsite channels discharge into the larger collector and conveyance channels.~~
3. ~~Calculations and summarized results for all onsite swales and onsite channels showing adequate depth and non-erosive velocities.~~
4. A specific discussion of how the proposed onsite drainage design will protect the facility from erosion ~~and the possible failure of the facilities resulting in a release of HTF~~.
5. Peak flow values at all downstream points of discharge from the Project.
6. Any other information needed to allow a correlation between the ~~HEC-HMS~~ **FLO-2D** model and the proposed drainage design.

~~C. Detailed scour calculations to justify toe-down depths for all soil cement segments, drop structures and any other features where scour is an issue.~~

~~D. Hydraulic analysis of all onsite and offsite channel confluences and a justification of whether or not soil cement or other suitable protection is required.~~

Verification: The project owner shall submit a Revised Project Drainage Report with the 30 percent Grading and Drainage Plans to ~~both~~ the ~~AO and~~ CPM for their review and comments sixty (60) days before project mobilization. The project owner will address comments provided by ~~both~~ the ~~AO and~~ CPM until approval of the report is issued. All comments and concepts presented in the approved Revised Project Drainage Report with the 30 percent Grading and Drainage Plans will be included in the final Grading and Drainage Plans. The Revised Project Drainage Report and 30 percent Grading and Drainage Plans shall be approved by ~~both~~ the ~~AO and~~ CPM.

DETAILED FLO-2D ANALYSIS

SOIL&WATER-12: The project owner shall provide a detailed hydraulic analysis utilizing FLO-2D which models pre- and post-development flood conditions for the 10-, 25- and 100-year storm events. ~~The post-development model must~~

~~include all proposed collector channels, end diffuser structures and berms.~~ The methods and results of the analysis shall be fully documented in a Technical Memorandum or in the revised Project Drainage Report. Graphical output must include depth and velocity mapping as well as mapping which graphically shows the changes in both of these parameters between the pre- and post development conditions. Color shading schemes used for the mapping must be consistent between all maps as well as clear and easily differentiated between designated intervals for hydraulic parameters. Intervals to be used in the mapping are as follows:

- Flow Depth: at 0.20 ft intervals up to 1 ft, and 0.40 ft intervals thereafter.
- Velocity: 0.5 ft/s intervals

~~A set of figures will be provided at a scale of no less than 1 in to 200 ft which show the extents and depths of flows entering the North, South and West channels for the 100-year event. A figure at the same scale will also be provided for depth, velocity and the relative change in these parameters at and downstream of the four end diffuser structures for the 10-, 25- and 100-year events.~~ Digital input and output files associated with the FLO-2D analysis must be included with all submittals. The results of this analysis will be used for design of the 30 percent project grading and drainage plans.

Verification: The project owner shall submit a detailed FLO-2D analysis to ~~both~~ the ~~AO and~~ CPM for ~~their~~ review and comment~~s~~ with the 30 percent plan Grading and Drainage Plans and revised Project Drainage Report required in **SOIL&WATER-11**. The project owner will address comments provided by the ~~both the AO and~~ CPM until approval of the analysis is issued.

~~DRAINAGE CHANNEL DESIGN~~

SOIL&WATER-13:DELETED ~~All collector and conveyance channels shall be constructed consistent with Riverside County Flood Control and Water Conservation District (RCFCWCD) guidelines where applicable. Deviation from those guidelines should be documented in the Project drainage report with the appropriate justification. Grade control structures shall be utilized where needed to meet channel velocity and Froude number requirements. Channels shall be sized along discreet sections based on the results of the detailed FLO-2D analysis described in **SOIL&WATER-12**. All grade control and drop structures shall have adequate toe-down to account for the design drop plus two additional feet to account for potential downcutting of the channel over time.~~

~~Channel confluence design must be given special consideration, especially as the preliminary Grading and Drainage Plans show 90 degree angles of confluence at nearly all locations. The issues of confluence hydraulics and potential scour shall be specifically addressed in the revised Drainage Report.~~

~~Offsite flows shall discharge directly into collector channels following the natural drainage patterns. The possible exception to this design approach is discussed in **SOIL&WATER-14** (F).~~

~~The proposed collector channel design must be fully documented in the Grading and Drainage plans and must include the following information:~~

~~A. Detailed and accurate cut/fill lines demonstrating in plan view how the channel would tie into existing grade and the solar facility.~~

~~B. Channel cross-sections at 200-foot intervals (or less as required to show all structures/configurations) showing the channel geometry, existing grade, proposed grade at the facility and how the channel would tie in at on both sides.~~

~~C. Detailed channel profiles showing existing and finished grades at channel flow line and left and right banks. All drop structures as well as the toe-of soil cement profile must also be shown and fully annotated. The 100-year water surface elevation will be provided on all profiles.~~

~~D. Typical sections and design details for all discreet channel sections, drop structures, channel confluences, flow dispersion structures and other relevant drainage features.~~

~~E. Consistent nomenclature and stationing on all plans, sections, profiles and details.~~

~~**Verification:** The project owner shall prepare preliminary, 30 percent channel design drawings and submit two copies for both the AO and CPM review and comment. The preliminary design drawings shall be submitted at the same time as the **Revised Project Drainage Report**, **SOIL&WATER-11** and FLO 2D Analysis in **SOIL&WATER-12**. The project owner will update and modify as necessary to obtain both the AO and CPM approval.~~

~~CHANNEL EROSION PROTECTION~~

SOIL&WATER–14: DELETED ~~The project owner must provide revised preliminary Grading and Drainage Plans which incorporate the items and information as listed below for the channels designated as North, West, South, Southeast and Central on the existing plans (AECOM2010a).~~

~~A. Soil cement bank protection must be provided such that the channels are adequately protected from bank erosion and lateral headcutting. The extents of the proposed bank protection must be shown on the revised Grading and Drainage Plans. Typical sections for these channels must show the layout of the bank protection including thickness, width and toe-down location and depth consistent with the scour calculation provided in the revised Drainage Report.~~

~~B. Soil cement bank protection shall be provided on both channel banks wherever 10-year channel flow velocity exceeds 5 ft/s. It shall be provided on the outer channel bank wherever offsite topography and a detailed FLO-2D analysis indicate surface flow would enter the collector channels.~~

~~C. Soil cement bank protection shall be provided at all channel confluences of otherwise unlined channels where the result of the detailed hydraulic analysis presented in the revised Drainage Report indicate the increased potential for erosion due to adverse angles of confluence. Detailed plans for each confluence showing the extents of the soil cement based on specific hydraulic conditions shall be provided in the formal Grading and Drainage Plans.~~

~~D. Other methods of channel stabilization, such as dumped riprap or gabions, will not be permitted. Bio-stabilization measures are not permitted.~~

~~E. Earthen berms used on the outside of collector channels to guide flow to discreet points of discharge into a channel shall not be utilized in lieu of soil cement on the outside bank of collector channels. Offsite flows shall discharge directly into collector channels.~~

~~F. The possible exception to the requirements of **SOIL&WATER-13**(E) would be along the North Channel for a total distance of approximately 14,000 feet. Along this reach, earthen berms and channel drop inlets might be utilized as opposed to soil along the upstream face of the collector channels. The berms would start at a point approximately 4,825 feet east of the western property boundary (just east of the natural wash) and extend to a point approximately 18,710 feet east of the west property boundary (where the north collector channel bottom width transitions from 100 feet to 150 feet wide). The use of berms and channel drop inlets may be justified along this reach as available topography indicates that the predominate flow pattern is roughly parallel to the channel and that inflows would be minimal. This condition as well as the actual extents of where berms may be utilized will be based on the results of the post-development FLO-2D analysis.~~

~~The use of unlined berms will require that the post-development FLO-2D analysis for the 100-year flow event demonstrate non-erosive flow velocities based on site specific soils characteristics. Lining of the outside of the berm with gunite or other approved material will be required along reaches where the 100-year flow velocities are shown to be erosive. In the absence of more specific data, 100-year flow velocities in excess of 5.0 ft/s will be considered erosive. Drop inlets must be fully protected from erosion, sized appropriately for the anticipated 100-year flow, and be designed for complete interception of the upstream flows to eliminate the potential for bypass flow to the subsequent downstream drop inlet structure. These structures must also to be fully protected from erosion and failure related to the 100-year discharge within the north collector channel.~~

~~G. The height of the proposed berms must be at least three feet and must provide a minimum of 1 foot of freeboard based on the flow depths determined in the post-development FLO-2D analysis. The maximum discharge to be collected at any single channel drop inlet should not be greater than 50 cfs based on the results of the post- development FLO-2D analysis.~~

H. ~~Design and construction criteria for the use of soil cement on the site shall be prepared by the Owner/Developer's engineer in conjunction with the design methodology established by the Geotechnical Engineer of Record. The design and construction criteria shall be based on local and/or regional requirements and specifications. The design and construction criteria, the geotechnical design for the soil cement, the site specific specifications for the soil cement, the method of installation for the soil cement, and the local or regional standards being used for the design criteria shall be provided to the CPM for review and comment consistent with the verification requirements for this Condition of Certification. The slope requirements that are proposed for use (3:1 or 4:1), and the associated method of installation (i.e., 8 inch lift versus slope application) shall be fully documented for review and approval by the CPM prior to any field installation of soil cement.~~

I. ~~A soils report indicating the suitability of the Project soils for use in the production of soil cement to the Project specifications shall be submitted with the revised Grading and Drainage Plans.~~

J. ~~The bottom of engineered collector channels may be left earthen or fully lined at the discretion of the engineer. Fully lined channels will have higher allowable velocities and Froude numbers assuming hydraulic jumps are modeled and considered in the channel design.~~

K. ~~If modifications to the existing drainages to allow construction of and future access to linear facilities require stabilization of the channel in the vicinity of those modifications, location of disturbance to the existing drainages shall be stabilized consistent with best engineering practice to eliminate future negative impacts to those drainages upstream and downstream of the linear facility in the form of downcutting, erosion and headcutting. The use of "non-engineered" culvert crossings shall not be allowed. All structures to be utilized in existing drainages along linear facilities shall be documented in the project drainage report and reflected in the project improvement plans. Channel erosion mitigation measures along linear facilities shall be subject to all the requirements of this Condition of Certification where applicable.~~

~~**Verification:**~~ ~~The required information and criteria shall be incorporated into the Grading and Drainage Plans and with all subsequent submittals as required in **SOIL&WATER-11** and **SOIL&WATER-12**. The project owner shall address all comments by the AO and CPM related to the channel erosion protection design through final plan approval.~~

~~CHANNEL MAINTENANCE PROGRAM~~

SOIL&WATER-15: DELETED ~~The project owner shall develop and implement a Channel Maintenance Program that provides long-term guidance to implement routine channel maintenance projects and comply with conditions of certification in a feasible and environmentally-sensitive manner. The Channel Maintenance Program will be a process and policy document~~

~~prepared by the Project owner, reviewed and approved by the both the AO and CPM. The Channel Maintenance Program shall include the following:~~

~~A. **Purpose and Objectives** – Establishes the main goals of the Program, of indefinite length, to maintain the diversion channel to meet its original design to provide flood protection, support Project mitigation, protect wildlife habitat and movement/ migration, and maintain groundwater recharge.~~

~~B. **Application and Use** - The channel maintenance work area is defined as the BSPP engineered channel, typically extending to the top of bank, include access roads, and any adjacent property that the Project owns or holds an easement for access and maintenance. The Program would include all channel maintenance as needed to protect the Project facilities and downstream property owners.~~

~~C. **Channel Maintenance Activities**~~

~~1. **Sediment Removal** - sediment is removed when it: (1) reduces the diversion channel effective flood capacity, to less than the design discharge, (2) prevents appurtenant hydraulic structures from functioning as intended, and (3) becomes a permanent, non-erodible barrier to instream flows.~~

~~2. **Vegetation Management** - Vegetation management shall include control of invasive or nonnative vegetation as prescribed in Condition of Certification **BIO-14**.~~

~~3. **Bank Protection and Grade Control Repairs** – Bank protection and grade control structure repairs involve any action by the Project owner to repair eroding banks, incising toes, scoured channel beds, as well as preventative erosion protection. The Project owner would implement instream repairs when the problem: (1) causes or could cause significant damage to the Project; adjacent property, or the structural elements of the diversion channel; (2) is a public safety concern; (3) negatively affects groundwater recharge; or (4) negatively affects the mitigation vegetation, habitat, or species of concern.~~

~~4. **Routine Channel Maintenance** - trash removal and associated debris to maintain channel design capacity; repair and installation of fences, gates and signs; grading and other repairs to restore the original contour of access roads and levees (if applicable); and removal of flow obstructions at Project storm drain outfalls.~~

~~5. **Channel Maintenance Program –** Exclusions including: emergency repair and CIP.~~

~~D. **Related Programmatic Documentation** – both the AO and CPM will review and approve the Channel Maintenance Program programmatic **documentation**. Maintenance activities shall comply with the stream alteration agreement provisions and requirements for channel maintenance activities consistent with California's endangered species protection regulations and other applicable regulations.~~

~~E. **Channel Maintenance Process Overview**~~

1. ~~**Program Development and Documentation** – This documentation provides the permitting requirements for channel maintenance work in accordance with the conditions of certification for individual routine maintenance of the engineered channel without having to perform separate CEQA/NEPA review or obtain permits.~~
2. ~~**Maintenance Guidelines** - based on two concepts: (1) the maintenance standard and (2) the acceptable maintenance condition, and applies to sediment removal, vegetation management, trash and debris collection, blockage removal, fence repairs, and access road maintenance.~~
3. ~~**Implementation** – Sets Maintenance Guidelines for vegetation and sediment management. The Project's vegetation management activities are established in Condition of Certification **BIO-14**. Maintenance Guidelines for sediment removal provide information on the allowable depth of sediment for the engineered channel that would continue to provide design discharge protection.~~
4. ~~**Reporting** – both the AO and CPM requires the following reports to be submitted each year as part of the Annual Compliance Report:~~
    a. ~~Channel Maintenance Work Plan - Describes the planned "major" maintenance activities and extent of work to be accomplished; and~~
    b. ~~Channel Maintenance Program Annual Report – Specifies which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).~~
    c. ~~A report describing "Lessons Learned" to evaluate the effectiveness of both resource protection and maintenance methods used throughout the year.~~

~~F. **Resource Protection Policies** - establishes policies to ensure that **resources** would be protected to the fullest extent feasible during routine channel maintenance activities. Policies would be developed to guide decision-making for channel maintenance activities. BMPs shall be developed to implement these policies.~~

Verification: ~~At least sixty (60) days prior to the start of any project-related site disturbance activities (excluding linear construction), the project owner shall coordinate with both the AO and CPM to develop the Channel Maintenance Program. The project owner shall submit two copies of the programmatic documentation, describing the proposed Channel Maintenance Program, to the both the AO and CPM (for review and approval). The project owner shall provide written notification that they plan to adopt and implement the measures identified in the approved Channel Maintenance Program. The project owner shall:~~

- ~~Supervise the implementation of a Channel Maintenance Program in accordance with conditions of certification;~~

- ~~Ensure the Project Construction and Operation Managers receive training on the Channel Maintenance Program; and~~
- ~~As part of the Project Annual Compliance Report to the both the AO and CPM, submit a Channel Maintenance Program Annual Report specifying which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).~~

ESTIMATION OF COLORADO RIVER IMPACTS

SOIL&WATER-16: The project owner may choose to further evaluate and estimate the amount of subsurface water flowing from the Colorado River due to project pumping. This estimate may be used for determining the appropriate volume of water for mitigation in accordance with Condition of Certification **SOIL&WATER-2**. The project owner shall do the following to provide an estimate for review and approval by the ~~AO and~~ CPM:

1. The project owner shall conduct a detailed analysis of the contribution of Colorado River water to the PVMGB from the project's groundwater extraction activities. The detailed analysis shall include:
   a. The conceptual model developed in the AFC and the Staff Assessment;
   b. The use of a numerical model. The model shall utilize the U.S. Geological Survey (USGS) numerical model developed by Leake et al. (2008). The model will include:
      i. Any additional horizontal and vertical geometry information gained through on- and offsite investigations conducted as part of the hydrogeological field investigations for the AFC ;
      ii. Aquifer properties developed as part of the AFC. The properties used must be the most conservative numbers that would result in the largest impact or flux from the Colorado River; and
      iii. The modeling effort will include an estimation of the relative error of the estimates derived.
   c. Reporting of the results of the modeling effort
   d. Estimation of the increased contribution of Colorado River water and groundwater from the adjacent Palo Verde Valley Groundwater Basin to the PVMGB as a result of project groundwater extraction
2. The analysis shall include the following elements:
   a. The change in groundwater flux attributable to the inflow from the Colorado River as a result of project pumping in afy for the life of the project;
   b. Relative error or confidence interval of the calculated change in groundwater flux attributable to the inflow from the Colorado River as a result of project pumping for the life of the project;

3. The project owner shall present the results of the conceptual model, numerical model, transient runs and sensitivity analysis in a report for review and approval by ~~AO and~~ CPM. The report shall include all pertinent information regarding the development of the numerical models. The report shall include:

   a. Introduction

   b. Previous Investigations

   c. Conceptual Model

   d. Numerical Model and Input Parameters

   e. Sensitivity Analysis

   f. Transient Modeling Runs

   g. Conclusions

Verification: **At least** ~~Within 30~~ **90** days ~~following certification of the proposed Project~~ **prior to initiation of groundwater pumping for grading activities**, the project owner will submit ~~to both AO and~~ **to** the CPM for ~~their~~ review and approval a report detailing the results of the modeling effort. The report will include the estimated amount of subsurface water flowing from the Colorado River due to project pumping. This estimate shall be used for determining the appropriate volume of water for mitigation in accordance with Condition of Certification **SOIL&WATER-2**.

GROUNDWATER QUALITY MONITORING AND REPORTING PLAN

SOIL&WATER-17: The project owner shall submit a Groundwater Quality Monitoring and Reporting Plan to the ~~AO and~~ CPM for review and approval. The Groundwater Quality Monitoring and Reporting Plan shall provide a description of the methodology for monitoring background and site groundwater levels and quality. The sampling required for the water quality monitoring program shall be implemented during groundwater level monitoring events in accordance with **SOIL&WATER-5**. Prior to project construction, monitoring shall commence to establish pre-construction groundwater quality conditions in the well proposed for the program and shall include pre-construction, construction, and project operation water use. The primary objectives for the water quality monitoring program is to identify potential changes in the existing water quality of the proposed water supply resulting from project pumping, if any, in concert with Condition of Certification **SOIL&WATER-5**, establish pre-construction and project related groundwater quality that can be quantitatively compared against observed and simulated levels near the project pumping well and near potentially impacted existing wells, and to avoid, minimize, or mitigate significant impacts to sensitive receptors (springs and groundwater-dependent vegetation, and groundwater supply users).

Verification: The project owner shall complete the following:

1. At least forty-five (45) days prior to construction, a Groundwater Quality Monitoring and Reporting Plan shall be submitted to the ~~AO and~~ CPM for review and approval

before completion of Condition of Certification **SOIL&WATER-3**. The Plan shall include a scaled map showing the site and vicinity, existing well locations, and proposed monitoring locations (both existing wells and new monitoring wells proposed for construction). Additional monitoring wells to be installed include wells required in accordance with Condition of Certification **SOIL&WATER-7**, for the evaporation ponds and land treatment unit proposed for the project. The map shall also include relevant natural and man-made features (existing and proposed as part of this project). The plan also shall provide: (1) well construction information and borehole lithology for each existing well proposed for use as a monitoring well; (2) description of proposed drilling and well installation methods; (3) proposed monitoring well design; and, (4) schedule for completion of the work.

2. At least thirty (30) days prior to construction, a Well Monitoring Installation and Groundwater Level Network Report shall be submitted to the ~~AO and~~ CPM for review and approval in conjunction with Condition of Certification **SOIL&WATER-5**. The report shall include a scaled map showing the final monitoring well network. It shall document the drilling methods employed, provide individual well construction as-builds, borehole lithology recorded from the drill cuttings, well development, and well survey results. The well survey shall measure the location and elevation of the top of the well casing and reference point for all water level measurements, and shall include the coordinate system and datum for the survey measurements. Additionally, the report shall describe the water level monitoring equipment employed in the wells and document their deployment and use.

3. As part of the monitoring well network development, all newly constructed monitoring wells shall be constructed consistent with State and Riverside County specifications.

4. At least thirty (30) days prior to use of any groundwater for construction, all groundwater quality and groundwater level monitoring data shall be reported to the ~~AO and~~ CPM. The report shall include the following:

   a. An assessment of pre-project groundwater levels, a summary of available climatic information (monthly average temperature and rainfall records from the nearest weather station), and a comparison and assessment of water level data relative to the assumptions and spatial trends simulated by the applicant's groundwater model.

   b. As assessment of pre-project groundwater quality with groundwater samples analyzed for total dissolved solids (TDS), chloride, nitrates, major cations and anions, oxygen-18 and deuterium isotopes, and any other constituents required by the ~~AO and/or~~ CPM to protecting existing water supply quality.

   c. The data shall be tabulated, summarized, and submitted to the ~~AO and~~ CPM. The data summary shall include the estimated range (minimum and maximum values), average, and median for each constituent analyzed. If a sufficient number of data points are available, the data shall also be analyzed using the Mann-Kendall test for trend at 90 percent confidence to assess whether pre-project water quality trends, if any, are statistically significant.

5. During project construction and during the first five years of project operations, the project owner shall semi-annually monitor the quality of groundwater and changes in groundwater elevation and submit data semi-annually to the ~~AO and~~ CPM. After five years of project operations, the frequency and scope of the monitoring program shall

be reassessed by the ~~AO and~~ CPM. The summary report shall document water level monitoring methods, the water level data, water level plots, and a comparison between pre- and post-project start-up water level trends as itemized below. The report shall also include a summary of actual water use conditions, monthly climatic information (temperature and rainfall) from the nearest meteorological monitoring station, and a comparison and assessment of water level data relative to the assumptions and simulated spatial trends predicted by the applicant's groundwater model.

a. Groundwater samples from all wells in the monitoring well network shall be analyzed and reported semi-annually for TDS, chloride, nitrates, cations and anions, oxygen-18 and deuterium isotopes. These analyses, and particularly the stable isotope data, can be useful for identifying water sources and assessing their contributions to the quality of water produced by wells.

b. For analysis purposes, pre-project water quality shall be defined by samples collected prior to project construction as specified above, and compliance data shall be defined by samples collected after the construction start date. The compliance data shall be analyzed for both trends and for contrast with the pre-project data.

c. Trends shall be analyzed using the Mann-Kendall test for trend at the 90 percent confidence. Trends in the compliance data shall be compared and contrasted to pre-project trends, if any.

d. The contrast between pre-project and compliance mean or median concentrations shall be compared using an Analysis of Variance (ANOVA) or other appropriate statistical method approved by the CRBRWQCB for evaluation of water quality impacts. A parametric ANOVA (for example, an F-test) can be conducted on the two data sets if the residuals between observed and expected values are normally distributed and have equal variance, or the data can be transformed to an approximately normal distribution. If the data cannot be represented by a normal distribution, then a nonparametric ANOVA shall be conducted (for example, the Kruskal-Wallis test). If a statistically significant difference is identified at 90 percent confidence between the two data sets, the monitoring data are inconsistent with random differences between the pre-project and baseline data indicating a significant water quality impact from project pumping may be occurring.

e. If compliance data indicate that the water supply quality has deteriorated (exceeds pre-project constituent concentrations in TDS, sodium, chloride, or other constituents identified as part of the monitoring plan and applicable Water Quality Objectives are exceeded for the applicable beneficial uses of the water supply) for three consecutive years, the project owner shall provide treatment or a new water supply to either meet or exceed pre-project water quality conditions to any impacted water supply wells.

SOIL&WATER-18: DELETED~~The Project is subject to the requirement of Title 22, Article 3, Sections 64400.80 through 64445 for a non-transient, non-community water system (serving 25 people or more for more than six~~

~~months). In addition, the system will require periodic monitoring for various bacteriological, inorganic and organic constituents.~~

~~**Verification:** The project owner shall obtain a permit to operate a non-transient, non-community water system with the County of Riverside at least sixty (60) days prior to commencement of operations at the site. In addition, the Project Owner shall submit to the AO and CPM a monitoring and reporting plan for production wells operated as part of the domestic water supply system prior to plant operations. The plan will include reporting requirements including monthly, quarterly and annual submissions.~~

~~The project owner shall designate a California Certified Water Treatment Plant Operator as well as the technical, managerial and financial requirements as prescribed by State law. The project owner will supply updates on an annual basis of monitoring requirements, any submittals to County of Riverside as well and proof of annual renewal of the operating permit.~~

STORM WATER DAMAGE MONITORING AND RESPONSE PLAN

SOIL&WATER-19 The project owner shall reduce impacts caused by large storms by ensuring solar panels, drainage washes that will have solar panels, and perimeter fencing withstand the 100-year storm event, establishing ongoing maintenance and inspection of storm water controls, and implementing a response plan to clean up damage and address ongoing issues.

The project owner shall ensure that the solar panels, drainage washes that will have solar panels are designed and installed to withstand storm water scour that may occur as a result of a 100-year, 24-hour storm event. The analysis of the storm event and resulting pylon stability shall be provided within a Pylon Insertion Depth and Solar Panel Stability Report to be completed by the project owner. This analysis shall incorporate results from site-specific geotechnical stability testing, as well as hydrologic and hydraulic storm water modeling performed by the project owner. The modeling shall be completed using methodology and assumptions approved by the CPM.

The project owner shall also develop a Storm Water Damage Monitoring and Response Plan to evaluate potential impacts from storm water, including damage to drainage washes, perimeter fencing, and solar panel supports that fail due to storm water flow or otherwise break and scatter mirror debris or other potential pollutants on to the ground surface.

The basis for determination of pylon embedment depths shall employ a step-by-step process as identified below and approved by the CPM:

A. **Determination of peak storm water flow within each sub-watershed from a 100-year event:**

- **Use of *Riverside County Flood Control and Water Conservation District Hydrology Manual (Riverside County Manual)* to specify hydrologic parameters to use in calculations; and**
- **Flo-2D model (or other approved models) must be developed to calculate storm flows from the mountain watersheds upstream of the project site, and flood flows at the project site, based upon hydrologic parameters from Riverside County.**

B. **Determination of potential total pylon scour depth:**

- **Potential channel erosion depths must be determined using the calculated design flows, as determined in A above, combined with Flo-2D to model onsite sediment transport.**
- **Potential local scour must be determined using the calculated design flows, as determined in A above, combined with the Federal Highway Administration (FHWA) equation for local bridge pier scour from the FHWA 2001 report, "Evaluating Scour at Bridges."**

C. **The results of the scour depth calculations and pylon stability testing must be used to determine the minimum necessary pylon embedment depth within the active channels. In the inactive portions of the alluvial fans that are not subject to channel erosion and local scour, the minimum pylon embedment depths must be based on the results of the pylon stability testing.**

D. **The results of the calculated peak storm water flows and channel erosion and pylon scour analysis together with the recommended pylon installation depths shall be submitted to the CPM for review and approval sixty (60) days prior to the start of solar panel installation.**

The Storm Water Damage Monitoring and Response Plan shall be submitted to the CPM for review and approval and shall include the following:

- **Detailed maps showing the installed location of all solar panels within each project phase;**
- **Description of the method of removing all soil spoils should any be generated;**
- **Each solar panel should be identified by a unique ID number marked to show initial ground surface at its base, and the depth of the pylon below ground;**
- **Minimum Depth Stability Threshold to be maintained of pylons to meet long-term stability for applicable wind, water (flowing and static), and debris loading effects;**

- **Above and below ground construction details of a typical installed solar panel;**
- **BMPs to be employed to minimize the potential impact of broken mirrors to soil resources;**
- **Methods and response time of mirror cleanup and measures that may be used to mitigate further impact to soil resources from broken mirror fragments; and**
- **Monitoring, documenting, and restoring the adjacent offsite downstream property when impacted by sedimentation or broken mirror shards.**

A plan to monitor and inspect periodically, before first seasonal and after every storm event:

- **Security and Tortoise Exclusion Fence: Inspect for damage and buildup of sediment or debris**
- **Solar panels within drainages or subject to drainage overflow or flooding: Inspect for tilting, mirror damage, depth of scour compared to pylon depth below ground and the Minimum Depth Stability Threshold, collapse, and downstream transport.**
- **Drainage washes: Inspect for substantial migration or changes in depth, and transport of broken glass.**
- **Adjacent offsite downstream property: Inspect for changes in the surface texture and quality from sediment buildup, erosion, or broken glass.**

Short-Term Incident-Based Response:

- **Security and Tortoise Exclusion Fence: repair damage, and remove built-up sediment and debris.**
- **Solar panels: Remove broken glass, damaged structure, and damaged wiring from the ground, and for pylons no longer meeting the Minimum Depth Stability Threshold, either replace/reinforce or remove the panels to avoid exposure to broken glass.**
- **Drainage washes: no short-term response necessary unless changes indicate risk to facility structures.**

Long-Term Design-Based Response:

- **Propose operation/BMP modifications to address ongoing issues. Include proposed changes to monitoring and response procedures, frequency, or standards.**

- Replace/reinforce pylons no longer meeting the Minimum Depth Stability Threshold or remove the mirrors to avoid exposure for broken glass.
- Propose design modifications to address ongoing issues. This may include construction of active storm water management diversion channels and/or detention ponds.

Inspection, short-term incident response, and long-term design based response may include activities both inside and outside of the project boundaries. For activities outside of the project boundaries the owner shall ensure all appropriate environmental review and approval has been completed before field activities begin.

Verification: At least sixty (60) days prior to installation of the first pylon, the project owner shall submit to the CPM a copy of the Pylon Insertion Depth and Solar Panel Stability Report for review and approval prior to construction.

At least sixty (60) days prior to commercial operation, the project owner shall submit to the CPM a copy of the Storm Water Damage Monitoring and Response Plan for review and approval prior to commercial operation. The project owner shall retain a copy of this plan onsite at all times. The project owner shall prepare an annual summary of the number of solar panels that fail due to damage, cause and extent of the damage, and cleanup and mitigation performed for each damaged solar panels. The annual summary shall also report on the effectiveness of the modified drainage washes against storms, including information on the damage and repair work or associated erosion control elements. The project owner shall submit proposed changes or revisions to the Storm Water Damage Monitoring and Response Plan to the CPM for review and approval.

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SOIL AND WATER RESOURCES - APPENDIX A

Acronyms Used in the Soil and Water Resources Section

af	acre-feet
AFC	Application for Certification
afy	acre-feet per year
bgs	below ground surface
BLM	United States Bureau of Land Management
BMPs	Best management practices
BP	Before Present
BSPP	Blythe Solar Power Project
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
CRB	Colorado River Board of California
CRBRWQCB	Colorado River Basin Regional Water Control Board
CWA	Clean Water Act
DESCP	Drainage Erosion and Sediment Control Plan
DR	Data Request
DWR	California Department of Water Resources
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
ft	feet
ft/s	feet per second
ft^2	square feet
ft^2/d	square feet per day
gpd	gallon per day
gpm	Gallons per minute
HTF	Heat Transfer Fluid
in	inches
LORS	Laws Ordinances, Regulations and Standards
LTU	Liquid Treatment Unit
mg/L	milligrams per liter
amsl	Above mean sea level
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service

NWIS	National Water Information System
OW	Observation Well
PVID	Palo Verde Irrigation District
PVMGB	Palo Verde Mesa Groundwater Basin
RCFCWCD	Riverside County Flood Control and Water Conservation District
RO	Reverse Osmosis
ROW	Right of Way
ROWD	Report of Waste Discharge
RPS	Renewable Portfolio Standard
RWQCB	Colorado River Basin Regional Water Control Board
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
t/ac/yr	tons per acre per year
TDS	Total Dissolved Solids
TW	Test Well
USACOE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey
WDR	Waste Discharge Requirement

SOIL AND WATER
APPENDIX B

Waste Discharge Requirement
Requirements for Waste Discharge

SOIL AND WATER RESOURCES – APPENDIX B

REQUIREMENTS FOR WASTE DISCHARGE— **NextEra Blythe Solar Energy Center** ~~Palo Verde Solar I~~, LLC, Owner/Operator, Blythe Solar Power Project, Riverside County

A. Discharge Specifications

1. The treatment or disposal of wastes at this Facility shall not cause pollution or nuisance as defined in Sections 13050 of Division 7 of the California Water Code (CWC).

2. The Discharger will maintain the monitoring wells in good working order at all times. Well maintenance may include periodic well re-development to remove sediments.

3. Thirty days prior to introduction of a new waste stream into the evaporation ponds, the Discharger must receive approval from the Regional Board's Executive Officer.

4. Waste material shall be confined or discharged to the evaporation ponds~~ and LTU~~.

5. Prior to drilling a new well or abandoning a well at the Facility, the Discharger shall notify, in writing, the Regional Board's Executive Officer of the proposed change.

6. Containment of waste shall be limited to the areas designated for such activities. Any revision or modification of the designated waste containment area, or any proposed change in operation at the Facility that changes the nature and constituents of the waste produced must be submitted in writing to the Regional Board's Executive Officer for review and approval before the proposed change in operations or modification of the designated area is implemented.

7. Any substantial increase or change in the annual average volume of material to be discharged under this order at the Facility must be submitted in writing to the Regional Board's Executive Officer for review and approval.

8. If any portions of the evaporation ponds are to be closed, the Discharger shall notify the Regional Board's Executive Officer at least 180 days prior to beginning any partial or final closure activities.

9. Fluids and/or materials discharged to and/or contained in the evaporation ponds shall not overflow the ponds.

10. Prior to the use of new chemicals for the purposes of adjustment or control of microbes, pH, scale, and corrosion of the cooling tower water and wastewater, the Discharger shall notify the Regional Board's Executive Officer in writing.

11. For the liquids in the evaporation ponds, a minimum freeboard of two (2) feet shall be maintained at all times.

12. Final disposal of residual waste from cleanup of the evaporation ponds shall be accomplished to the satisfaction of the Regional Board's Executive Officer upon abandonment or closure of operations.

13. The evaporation ponds shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods having a predicted frequency of once in 100 years.

14. Prior to removal of solid material that has accumulated in the concrete evaporation ponds, an analysis of the material must be conducted and the material must be disposed of in a manner consistent with that analysis and applicable laws and regulations.

15. Conveyance systems throughout the Facility area shall be cleaned out at least every 90 days to prevent the buildup of solids.

16. Pipe maintenance and de-scaling activities that include hydroblasting and/or sandblasting shall be performed within a designated area that minimizes the potential for release to the environment. Waste generated as a result of these activities shall be disposed of in accordance with applicable laws and regulations. Water from the hydroblasting process shall be conveyed to the evaporation ponds.

17. Public contact with wastewater shall be precluded through such means as fences, signs, or other acceptable alternatives.

18. The evaporations ponds shall be managed and maintained to ensure their effectiveness.~~, in particular,~~

19. Implementation of erosion control measures shall assure that small coves and irregularities are not created.

20. The liner beneath the evaporation ponds shall be appropriately maintained to ensure its proper functioning.

21. Solid material shall be removed from the evaporation ponds in a manner that minimizes the likelihood of damage to the liner.

22. Ninety days prior to the cessation of discharge operations at the Facility, the Discharger shall submit a workplan, subject to approval of the Regional Board's Executive Officer, for assessing the extent, if any, of contamination of natural geological materials and waters of the Palo Verde Mesa Groundwater Basin by the waste. One hundred twenty days following workplan approval, the Discharger shall submit a technical report presenting results of the contamination assessment. A California Registered Civil Engineer or Certified Engineering Geologist must prepare the workplan, contamination assessment, and engineering report.

23. Upon ceasing operation at the Facility, all waste, all natural geologic material contaminated by waste, and all surplus or unprocessed material shall be removed from the site and disposed of in accordance with applicable laws and regulations.

24. The Discharger shall establish an irrevocable bond for closure in an amount acceptable to the Regional Board's Executive Officer or provide other means to ensure financial security for closure if closure is needed at the discharging site. The closure fund shall be established (or evidence of an existing closure fund shall be provided) within six (6) months of the adoption of this Order.

25. Surface drainage from tributary areas or subsurface sources, shall not contact or percolate through the waste discharged at this site.

26. The Discharger shall implement the attached Monitoring and Reporting Program, Appendix D, and revisions thereto, in order to detect, at the earliest opportunity, any unauthorized discharge of waste constituents from the Facility, or any impairment of beneficial uses associated with (caused by) discharges of waste to the ~~brine~~ **evaporation** pond.

27. The Discharger shall use the constituents listed in the attached Monitoring and Reporting Program, Appendix D, and revisions thereto, as "Monitoring Parameters".

28. The Discharger shall follow the Water Quality Protection Standard (WQPS) for detection monitoring established by the Regional Board. The following are parts of WQPS as established by the Regional Board's Executive Officer:

    a. The Discharger shall test for the monitoring parameters and the Constituents of Concern listed in the Monitoring and Reporting R7-2010-0xxx and revisions thereto.

    b. Concentration Limits – The concentration limit for each monitoring parameter and constituents of concern for each monitoring point (as stated in the Detection Monitoring Program), shall be its background valued as obtained during that reporting period.

29. All current, revised, and/or proposed monitoring points must be approved by the Region Board's Executive Officer.

30. Water used for the process and site maintenance shall be limited to the amount necessary in the process, for dust control, and for Facility cleanup and maintenance.

31. The Discharger shall not cause or permit the release of pollutants, or waste constituents, in a manner which could cause or contribute to a condition of contamination, nuisance, or pollution to occur.

32. The Discharger must develop and implement a Hazardous Materials Business Plan (HMBP), which will include, at a minimum, procedures for:

a. Hazardous materials handling, use, and storage;
b. Emergency response;
c. Spill control and prevention;
d. Employee training; and
e. Reporting and record keeping.

33. Hazardous materials expected to be used during construction include: unleaded gasoline, diesel fuel, oil, lubricants (i.e., motor oil, transmission fluid, and hydraulic fluid), solvents, adhesives, and paint materials. There are no feasible alternatives to these materials for construction or operation of construction vehicles and equipment, or for painting and caulking buildings and equipment.

34. The construction contractor will be responsible for assuring that the use, storage and handling of these materials will comply with applicable federal, state, and local laws, ordinances, regulations and standards (LORS), including licensing, personnel training, accumulation limits, reporting requirements, and recordkeeping.

35. During Facility operations, chemicals will be stored in chemical storage areas appropriately designed for their individual characteristics. Bulk chemicals will be stored outdoors on impervious surfaces in aboveground storage tanks with secondary containment. Secondary containment areas for bulk storage tanks will not have drains. Any chemical spills in these areas will be removed with portable equipment and reused or disposed of properly. Other chemicals will be stored and used in their delivery containers.

36. A portable storage trailer may be on site for storage of maintenance lube oils, chemicals, paints, and other construction materials, as needed. All drains and vent piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious vapors. The storage, containment, handling, and use of these chemicals will be managed in accordance with applicable laws, ordinances, regulations, and standards.

37. Small quantities of hazardous wastes will be generated over the course of construction. These may include paint, spent solvents, and spent welding materials. Some hazardous wastes will be recycled, including used oils from equipment maintenance, and oil-contaminated materials such as spent oil filters, rags, or other cleanup materials. Used oil must be recycled, and oil or heavy metal contaminated materials (e.g., filters) requiring disposal must be disposed of in a Class I waste disposal facility. Scale from pipe and equipment cleaning operations, and solids from the evaporation pond, will be disposed of in a similar manner.

38. All hazardous wastes generated during facility construction and operation must be handled and disposed of in accordance with applicable laws, ordinances, regulations, and standards. Any hazardous wastes generated during construction must be collected in hazardous waste accumulation containers near the point of

generation and moved daily to the contractor's 90-day hazardous waste storage area located on site. The accumulated waste must subsequently be delivered to an authorized waste management facility. Hazardous wastes must be either recycled or managed and disposed of properly in a licensed Class I waste disposal facility authorized to accept the waste.

39. The Discharger shall monitor the evaporation ponds in conformance with applicable CCR Title 27 requirements for Class II surface impoundment waste management units.

40. The leachate collection and removal system must be used to provide preliminary detection monitoring of leaks through the top liner of the double-lined evaporation ponds. Physical evidence of leachate beneath the upper concrete liner shall be interpreted as a warning that containment of the evaporation pond contents may be compromised.

41. Groundwater monitoring wells must be constructed adjacent to and both up gradient and down gradient of the evaporation ponds to provide background and detection monitoring for any potential release from the evaporation ponds containment. The Point of Compliance to be used for the detection monitoring must be the shallow groundwater beneath the evaporation pond. The groundwater monitoring wells must be constructed in conformance with Title 27 CCR Section 20415 requirements. The monitoring wells must be designed to meet the background and detection monitoring requirements in conformance with Title 27 CCR Section 20415(b)(1)(B) as applicable, including:

    a. Providing a sufficient number of monitoring points to yield ground water samples from the uppermost aquifer that represent the quality of ground water passing the Point of Compliance and to allow for the detection of a release from the evaporation ponds;

    b. Providing a sufficient number of monitoring points and background monitoring points installed at appropriate locations and depths to yield ground water samples from the uppermost aquifer to provide the best assurance of the earliest possible detection of a release from the evaporation ponds; and

    c. Selecting monitoring point locations and depths that include the zone(s) of highest hydraulic conductivity in the ground water body monitored.

42. The detection monitoring wells shall be constructed to meet the well performance standards set forth in Title 27 CCR Section 20415(b)(4), as applicable, including:

43. All monitoring wells shall be cased and constructed in a manner that maintains the integrity of the monitoring well bore hole and prevents the bore hole from acting as a conduit for contaminant transport.

44. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative ground water samples.

45. For each monitoring well, the annular space (i.e., the space between the bore hole and well casing) above and below the sampling interval shall be appropriately sealed to prevent entry of contaminants from the ground surface, entry of contaminants from the unsaturated zone, cross contamination between portions of the zone of saturation, and contamination of samples.

46. All monitoring wells shall be adequately developed to enable collection of representative ground water samples.

47. The monitoring program must also meet the general requirements set forth in Title 27 CCR Section 20415(e), which require that all monitoring systems be designed and certified by a registered geologist or a registered civil engineer. The applicable general requirements set forth for boring logs, quality assurance/quality control, sampling and analytical methods used, background sampling, data analysis, and other reporting as applicable will be implemented.

48. Baseline samples of the groundwater must be collected from each of the monitoring wells and analyzed prior to discharging wastewater to the evaporation ponds. The groundwater must be initially sampled for each of the proposed monitoring parameters listed in the attached Monitoring and Reporting Program, Appendix D, and any additional Constituents of Concern identified by the Regional Board.

B. Prohibitions

1. The discharge or deposit of solid waste to the evaporation ponds as a final form of disposal is prohibited, unless authorized by the Regional Board’s Executive Officer.

2. The Discharger is prohibited from discharging, treating or composting at this site the following wastes:

    a. Municipal solid waste;

    b. Sludge (including sewage sludge, water treatment sludge, and industrial sludge);

    c. Septage;

    d. Liquid waste, unless specifically allowed by these WDRs or approved by the Regional Board’s Executive Officer;

    e. Oily and greasy liquid waste; unless specifically allowed by these WDRs or approved by the Regional Board’s Executive Officer;

    f. Hot, burning waste materials or ash.

3. The Discharger shall not cause degradation of any groundwater aquifer or water supply.

4. The discharge of waste to land not owned or controlled by the Discharger is prohibited.

5. Use of wastewater ~~or cooling tower liquids~~ on access roads, well pads, or other developed project locations for dust control is prohibited.

6. The discharge of hazardous or designated wastes to other than a waste management unit authorized to receive such waste is prohibited.

7. Any hazardous waste generated or stored at the facility will be contained and disposed in a manner that complies with federal and state regulations.

8. Wastewater or any fluids in the evaporation ponds shall not enter any canal, drainage, or drains (including subsurface drainage systems) which could provide flow to the Waters of the State.

9. The Discharger shall appropriately dispose of any materials, including fluids and sediments removed from the evaporation ponds.

10. The Discharger shall neither cause nor contribute to the contamination or pollution of ground water via the release of waste constituents in either liquid or gaseous phase.

11. Direct or indirect discharge of any waste to any surface water or surface drainage courses is prohibited.

12. The Discharger shall not cause the concentration of any Constituent of Concern or Monitoring Parameter to exceed its respective background value in any monitored medium at any Monitoring Point assigned for Detection Monitoring pursuant to the attached Monitoring and Reporting, Appendix C, and future revisions thereto.

C. Provisions

1. The Discharger shall comply with the attached Monitoring and Reporting Program, Appendix D, and future revisions thereto, as specified by the Regional Board’s Executive Officer.

2. Unless otherwise approved by Regional Board’s Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health. All analyses shall be conducted in accordance with the latest edition of “Guideline Establishing Test Procedures for Analysis of Pollutants”, promulgated by the United States Environmental Protection Agency.

3. The laboratory shall use detection limits less than or equal to Environmental Protection Agency (EPA) Action Level/Maximum Contaminate Levels (MCLs) or California Department of Public Health (CDPH) Notification Level/MCL for all samples analyzed. The lowest concentration, whether EPA or CDPH, of the two agencies must be used for the analysis.

4. Prior to any change in ownership of this operation, the Discharger shall transmit a copy of the Board Order to the succeeding owner/operator, and forward a copy of the transmittal letter to the Regional Board.

5. Prior to any modification in this facility that would result in material change in the quality or quantity of discharge, or any material change in the location of discharge, the Discharger shall report all pertinent information in writing to the Regional Board's Executive Officer and obtain revised waste discharge requirements before any modification is implemented.

6. All permanent containment structures and erosion and drainage control systems shall be certified by a California Registered Civil Engineer or Certified Engineering Geologist as meeting the prescriptive standards and performance goals.

7. The Discharger shall ensure that all site-operating personnel are familiar with the content of these WDRs, and shall maintain a copy of these WDRs at the site.

8. These WDRs do not authorize violation of any federal, state, or local laws or regulations.

9. The Discharger shall allow the Regional Board, or an authorized representative, upon presentation of credential and other documents as may be required by law, to:

   a. Enter upon the premises regulated by these WDRs, or the place where records must be kept under the conditions of these WDRs;

   b. Have access to and copy, at reasonable times, any records that shall be kept under the condition of these WDRs;

   c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under these WDRs; and

   d. Sample or monitor at reasonable times, for the purpose of assuring compliance with these WDRs or as otherwise authorized by the CWC or California Code of Regulations, any substances or parameters at this location.

10. The Discharger shall comply with all of the conditions of these WDRs. Any noncompliance with these WDRs constitutes a violation of the Porter-Cologne Water Quality Act and may be grounds for enforcement action.

11. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with these WDRs. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.

12. These WDRs do not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

13. The Discharger shall comply with the following:

    a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

    b. The Discharger shall retain records of all monitoring information, copies of all reports required by these WDRs, and records of all data used to complete the application for these WDRs, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Board's Executive Officer at any time.

    c. Records of monitoring information shall include:

        i. The date, exact places, and time of sampling or measurements.

        ii. The individual(s) who performed the sampling or measurements.

        iii. The date(s) analyses were performed.

        iv. The individual(s) responsible for reviewing the analyses.

        v. The results of such analyses.

    d. Monitoring must be conducted according to test procedures described in the attached Monitoring and Reporting Program, Appendix D, unless other test procedures have been specified in these WDRs or approved by the Regional Board's Executive Officer.

14. All monitoring systems shall be readily accessible for sampling and inspection.

15. The Discharger is the responsible party for the WDRs, and the monitoring and reporting program for the Facility. The Discharger shall comply with all conditions of these WDRs. Violations may result in enforcement actions, requiring corrective action or imposing civil monetary liability.

16. The Discharger shall furnish, under penalty of perjury, technical monitoring program reports, and such reports shall be submitted in accordance with the specifications prepared by the Regional Board's Executive Officer. Such specifications are subject to periodic revisions as may be warranted.

17. The Discharger may be required to submit technical reports as directed by the Regional Board's Executive Officer.

18. The procedure for preparing samples for the analyses shall be consistent with the attached Monitoring and Reporting Program, Appendix D, and any future revisions thereto. The Monitoring Reports shall be certified to be true and correct, and signed, under penalty of perjury, by an authorized official of the company. All

technical reports require the signature of a California Registered Professional Engineer or Professional Geologist.

All monitoring shall be done as described in Title 27 of the CCRs.

SOIL AND WATER
APPENDIX C

Waste Discharge Requirement
Requirements for Waste Discharge

SOIL AND WATER RESOURCES – APPENDIX C

REQUIREMENTS FOR WASTE DISCHARGE— NextEra Blythe Solar Energy Center ~~Palo Verde Solar I~~, LLC, Owner/Operator, Blythe Solar Power Project, Riverside County

A. Discharge Specifications

49. The treatment or disposal of wastes at this Facility shall not cause pollution or nuisance as defined in Sections 13050 of Division 7 of the California Water Code (CWC).

50. The Discharger will maintain the monitoring wells in good working order at all times. Well maintenance may include periodic well re-development to remove sediments.

51. Thirty days prior to introduction of a new waste stream into the evaporation ponds, the Discharger must receive approval from the Regional Board's Executive Officer.

52. Waste material shall be confined or discharged to the evaporation ponds~~ and LTU~~.

53. Prior to drilling a new well or abandoning a well at the Facility, the Discharger shall notify, in writing, the Regional Board's Executive Officer of the proposed change.

54. Containment of waste shall be limited to the areas designated for such activities. Any revision or modification of the designated waste containment area, or any proposed change in operation at the Facility that changes the nature and constituents of the waste produced must be submitted in writing to the Regional Board's Executive Officer for review and approval before the proposed change in operations or modification of the designated area is implemented.

55. Any substantial increase or change in the annual average volume of material to be discharged under this order at the Facility must be submitted in writing to the Regional Board's Executive Officer for review and approval.

56. If any portions of the evaporation ponds are to be closed, the Discharger shall notify the Regional Board's Executive Officer at least 180 days prior to beginning any partial or final closure activities.

57. Fluids and/or materials discharged to and/or contained in the evaporation ponds shall not overflow the ponds.

58. Prior to the use of new chemicals for the purposes of adjustment or control of microbes, pH, scale, and corrosion of the cooling tower water and wastewater, the Discharger shall notify the Regional Board's Executive Officer in writing.

59. For the liquids in the evaporation ponds, a minimum freeboard of two (2) feet shall be maintained at all times.

60. Final disposal of residual waste from cleanup of the evaporation ponds shall be accomplished to the satisfaction of the Regional Board's Executive Officer upon abandonment or closure of operations.

61. The evaporation ponds shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods having a predicted frequency of once in 100 years.

62. Prior to removal of solid material that has accumulated in the concrete evaporation ponds, an analysis of the material must be conducted and the material must be disposed of in a manner consistent with that analysis and applicable laws and regulations.

63. Conveyance systems throughout the Facility area shall be cleaned out at least every 90 days to prevent the buildup of solids.

64. Pipe maintenance and de-scaling activities that include hydroblasting and/or sandblasting shall be performed within a designated area that minimizes the potential for release to the environment. Waste generated as a result of these activities shall be disposed of in accordance with applicable laws and regulations. Water from the hydroblasting process shall be conveyed to the evaporation ponds.

65. Public contact with wastewater shall be precluded through such means as fences, signs, or other acceptable alternatives.

66. The evaporations ponds shall be managed and maintained to ensure their effectiveness.~~, in particular,~~

67. Implementation of erosion control measures shall assure that small coves and irregularities are not created.

68. The liner beneath the evaporation ponds shall be appropriately maintained to ensure its proper functioning.

69. Solid material shall be removed from the evaporation ponds in a manner that minimizes the likelihood of damage to the liner.

70. Ninety days prior to the cessation of discharge operations at the Facility, the Discharger shall submit a workplan, subject to approval of the Regional Board's Executive Officer, for assessing the extent, if any, of contamination of natural geological materials and waters of the Palo Verde Mesa Groundwater Basin by the waste. One hundred twenty days following workplan approval, the Discharger shall submit a technical report presenting results of the contamination assessment. A California Registered Civil Engineer or Certified Engineering Geologist must prepare the workplan, contamination assessment, and engineering report.

71. Upon ceasing operation at the Facility, all waste, all natural geologic material contaminated by waste, and all surplus or unprocessed material shall be removed from the site and disposed of in accordance with applicable laws and regulations.

72. The Discharger shall establish an irrevocable bond for closure in an amount acceptable to the Regional Board's Executive Officer or provide other means to ensure financial security for closure if closure is needed at the discharging site. The closure fund shall be established (or evidence of an existing closure fund shall be provided) within six (6) months of the adoption of this Order.

73. Surface drainage from tributary areas or subsurface sources, shall not contact or percolate through the waste discharged at this site.

74. The Discharger shall implement the attached Monitoring and Reporting Program, Appendix D, and revisions thereto, in order to detect, at the earliest opportunity, any unauthorized discharge of waste constituents from the Facility, or any impairment of beneficial uses associated with (caused by) discharges of waste to the ~~brine~~ **evaporation** pond.

75. The Discharger shall use the constituents listed in the attached Monitoring and Reporting Program, Appendix D, and revisions thereto, as "Monitoring Parameters".

76. The Discharger shall follow the Water Quality Protection Standard (WQPS) for detection monitoring established by the Regional Board. The following are parts of WQPS as established by the Regional Board's Executive Officer:

    a. The Discharger shall test for the monitoring parameters and the Constituents of Concern listed in the Monitoring and Reporting R7-2010-0xxx and revisions thereto.

    b. Concentration Limits – The concentration limit for each monitoring parameter and constituents of concern for each monitoring point (as stated in the Detection Monitoring Program), shall be its background valued as obtained during that reporting period.

77. All current, revised, and/or proposed monitoring points must be approved by the Region Board's Executive Officer.

78. Water used for the process and site maintenance shall be limited to the amount necessary in the process, for dust control, and for Facility cleanup and maintenance.

79. The Discharger shall not cause or permit the release of pollutants, or waste constituents, in a manner which could cause or contribute to a condition of contamination, nuisance, or pollution to occur.

80. The Discharger must develop and implement a Hazardous Materials Business Plan (HMBP), which will include, at a minimum, procedures for:

a. Hazardous materials handling, use, and storage;
b. Emergency response;
c. Spill control and prevention;
d. Employee training; and
e. Reporting and record keeping.

81. Hazardous materials expected to be used during construction include: unleaded gasoline, diesel fuel, oil, lubricants (i.e., motor oil, transmission fluid, and hydraulic fluid), solvents, adhesives, and paint materials. There are no feasible alternatives to these materials for construction or operation of construction vehicles and equipment, or for painting and caulking buildings and equipment.

82. The construction contractor will be responsible for assuring that the use, storage and handling of these materials will comply with applicable federal, state, and local laws, ordinances, regulations and standards (LORS), including licensing, personnel training, accumulation limits, reporting requirements, and recordkeeping.

83. During Facility operations, chemicals will be stored in chemical storage areas appropriately designed for their individual characteristics. Bulk chemicals will be stored outdoors on impervious surfaces in aboveground storage tanks with secondary containment. Secondary containment areas for bulk storage tanks will not have drains. Any chemical spills in these areas will be removed with portable equipment and reused or disposed of properly. Other chemicals will be stored and used in their delivery containers.

84. A portable storage trailer may be on site for storage of maintenance lube oils, chemicals, paints, and other construction materials, as needed. All drains and vent piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious vapors. The storage, containment, handling, and use of these chemicals will be managed in accordance with applicable laws, ordinances, regulations, and standards.

85. Small quantities of hazardous wastes will be generated over the course of construction. These may include paint, spent solvents, and spent welding materials. Some hazardous wastes will be recycled, including used oils from equipment maintenance, and oil-contaminated materials such as spent oil filters, rags, or other cleanup materials. Used oil must be recycled, and oil or heavy metal contaminated materials (e.g., filters) requiring disposal must be disposed of in a Class I waste disposal facility. Scale from pipe and equipment cleaning operations, and solids from the evaporation pond, will be disposed of in a similar manner.

86. All hazardous wastes generated during facility construction and operation must be handled and disposed of in accordance with applicable laws, ordinances, regulations, and standards. Any hazardous wastes generated during construction must be collected in hazardous waste accumulation containers near the point of generation and moved daily to the contractor's 90-day hazardous waste storage area located on site. The accumulated waste must subsequently be delivered to an authorized waste management facility. Hazardous wastes must be either recycled

or managed and disposed of properly in a licensed Class I waste disposal facility authorized to accept the waste.

87. The Discharger shall monitor the evaporation ponds in conformance with applicable CCR Title 27 requirements for Class II surface impoundment waste management units.

88. The leachate collection and removal system must be used to provide preliminary detection monitoring of leaks through the top liner of the double-lined evaporation ponds. Physical evidence of leachate beneath the upper concrete liner shall be interpreted as a warning that containment of the evaporation pond contents may be compromised.

89. Groundwater monitoring wells must be constructed adjacent to and both up gradient and down gradient of the evaporation ponds to provide background and detection monitoring for any potential release from the evaporation ponds containment. The Point of Compliance to be used for the detection monitoring must be the shallow groundwater beneath the evaporation pond. The groundwater monitoring wells must be constructed in conformance with Title 27 CCR Section 20415 requirements. The monitoring wells must be designed to meet the background and detection monitoring requirements in conformance with Title 27 CCR Section 20415(b)(1)(B) as applicable, including:

    d. Providing a sufficient number of monitoring points to yield ground water samples from the uppermost aquifer that represent the quality of ground water passing the Point of Compliance and to allow for the detection of a release from the evaporation ponds;

    e. Providing a sufficient number of monitoring points and background monitoring points installed at appropriate locations and depths to yield ground water samples from the uppermost aquifer to provide the best assurance of the earliest possible detection of a release from the evaporation ponds; and

    f. Selecting monitoring point locations and depths that include the zone(s) of highest hydraulic conductivity in the ground water body monitored.

90. The detection monitoring wells shall be constructed to meet the well performance standards set forth in Title 27 CCR Section 20415(b)(4), as applicable, including:

91. All monitoring wells shall be cased and constructed in a manner that maintains the integrity of the monitoring well bore hole and prevents the bore hole from acting as a conduit for contaminant transport.

92. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative ground water samples.

93. For each monitoring well, the annular space (i.e., the space between the bore hole and well casing) above and below the sampling interval shall be appropriately

sealed to prevent entry of contaminants from the ground surface, entry of contaminants from the unsaturated zone, cross contamination between portions of the zone of saturation, and contamination of samples.

94. All monitoring wells shall be adequately developed to enable collection of representative ground water samples.

95. The monitoring program must also meet the general requirements set forth in Title 27 CCR Section 20415(e), which require that all monitoring systems be designed and certified by a registered geologist or a registered civil engineer. The applicable general requirements set forth for boring logs, quality assurance/quality control, sampling and analytical methods used, background sampling, data analysis, and other reporting as applicable will be implemented.

96. Baseline samples of the groundwater must be collected from each of the monitoring wells and analyzed prior to discharging wastewater to the evaporation ponds. The groundwater must be initially sampled for each of the proposed monitoring parameters listed in the attached Monitoring and Reporting Program, Appendix D, and any additional Constituents of Concern identified by the Regional Board.

B. Prohibitions

13. The discharge or deposit of solid waste to the evaporation ponds as a final form of disposal is prohibited, unless authorized by the Regional Board’s Executive Officer.

14. The Discharger is prohibited from discharging, treating or composting at this site the following wastes:

    a. Municipal solid waste;

    b. Sludge (including sewage sludge, water treatment sludge, and industrial sludge);

    c. Septage;

    d. Liquid waste, unless specifically allowed by these WDRs or approved by the Regional Board’s Executive Officer;

    e. Oily and greasy liquid waste; unless specifically allowed by these WDRs or approved by the Regional Board’s Executive Officer;

    f. Hot, burning waste materials or ash.

15. The Discharger shall not cause degradation of any groundwater aquifer or water supply.

16. The discharge of waste to land not owned or controlled by the Discharger is prohibited.

17. Use of wastewater ~~or cooling tower liquids~~ on access roads, well pads, or other developed project locations for dust control is prohibited.

18. The discharge of hazardous or designated wastes to other than a waste management unit authorized to receive such waste is prohibited.

19. Any hazardous waste generated or stored at the facility will be contained and disposed in a manner that complies with federal and state regulations.

20. Wastewater or any fluids in the evaporation ponds shall not enter any canal, drainage, or drains (including subsurface drainage systems) which could provide flow to the Waters of the State.

21. The Discharger shall appropriately dispose of any materials, including fluids and sediments removed from the evaporation ponds.

22. The Discharger shall neither cause nor contribute to the contamination or pollution of ground water via the release of waste constituents in either liquid or gaseous phase.

23. Direct or indirect discharge of any waste to any surface water or surface drainage courses is prohibited.

24. The Discharger shall not cause the concentration of any Constituent of Concern or Monitoring Parameter to exceed its respective background value in any monitored medium at any Monitoring Point assigned for Detection Monitoring pursuant to the attached Monitoring and Reporting, Appendix C, and future revisions thereto.

C. Provisions

19. The Discharger shall comply with the attached Monitoring and Reporting Program, Appendix D, and future revisions thereto, as specified by the Regional Board's Executive Officer.

20. Unless otherwise approved by Regional Board's Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health. All analyses shall be conducted in accordance with the latest edition of "Guideline Establishing Test Procedures for Analysis of Pollutants", promulgated by the United States Environmental Protection Agency.

21. The laboratory shall use detection limits less than or equal to Environmental Protection Agency (EPA) Action Level/Maximum Contaminate Levels (MCLs) or California Department of Public Health (CDPH) Notification Level/MCL for all samples analyzed. The lowest concentration, whether EPA or CDPH, of the two agencies must be used for the analysis.

22. Prior to any change in ownership of this operation, the Discharger shall transmit a copy of the Board Order to the succeeding owner/operator, and forward a copy of the transmittal letter to the Regional Board.

23. Prior to any modification in this facility that would result in material change in the quality or quantity of discharge, or any material change in the location of discharge, the Discharger shall report all pertinent information in writing to the Regional Board's Executive Officer and obtain revised waste discharge requirements before any modification is implemented.

24. All permanent containment structures and erosion and drainage control systems shall be certified by a California Registered Civil Engineer or Certified Engineering Geologist as meeting the prescriptive standards and performance goals.

25. The Discharger shall ensure that all site-operating personnel are familiar with the content of these WDRs, and shall maintain a copy of these WDRs at the site.

26. These WDRs do not authorize violation of any federal, state, or local laws or regulations.

27. The Discharger shall allow the Regional Board, or an authorized representative, upon presentation of credential and other documents as may be required by law, to:

    a. Enter upon the premises regulated by these WDRs, or the place where records must be kept under the conditions of these WDRs;

    b. Have access to and copy, at reasonable times, any records that shall be kept under the condition of these WDRs;

    c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under these WDRs; and

    d. Sample or monitor at reasonable times, for the purpose of assuring compliance with these WDRs or as otherwise authorized by the CWC or California Code of Regulations, any substances or parameters at this location.

28. The Discharger shall comply with all of the conditions of these WDRs. Any noncompliance with these WDRs constitutes a violation of the Porter-Cologne Water Quality Act and may be grounds for enforcement action.

29. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with these WDRs. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.

30. These WDRs do not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

31. The Discharger shall comply with the following:

    a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

    b. The Discharger shall retain records of all monitoring information, copies of all reports required by these WDRs, and records of all data used to complete the application for these WDRs, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Board's Executive Officer at any time.

    c. Records of monitoring information shall include:

        i. The date, exact places, and time of sampling or measurements.

        ii. The individual(s) who performed the sampling or measurements.

        iii. The date(s) analyses were performed.

        iv. The individual(s) responsible for reviewing the analyses.

        v. The results of such analyses.

    d. Monitoring must be conducted according to test procedures described in the attached Monitoring and Reporting Program, Appendix D, unless other test procedures have been specified in these WDRs or approved by the Regional Board's Executive Officer.

32. All monitoring systems shall be readily accessible for sampling and inspection.

33. The Discharger is the responsible party for the WDRs, and the monitoring and reporting program for the Facility. The Discharger shall comply with all conditions of these WDRs. Violations may result in enforcement actions, requiring corrective action or imposing civil monetary liability.

34. The Discharger shall furnish, under penalty of perjury, technical monitoring program reports, and such reports shall be submitted in accordance with the specifications prepared by the Regional Board's Executive Officer. Such specifications are subject to periodic revisions as may be warranted.

35. The Discharger may be required to submit technical reports as directed by the Regional Board's Executive Officer.

36. The procedure for preparing samples for the analyses shall be consistent with the attached Monitoring and Reporting Program, Appendix D, and any future revisions thereto. The Monitoring Reports shall be certified to be true and correct, and signed, under penalty of perjury, by an authorized official of the company. All

technical reports require the signature of a California Registered Professional Engineer or Professional Geologist.

37. All monitoring shall be done as described in Title 27 of the CCRs.

SOIL AND WATER
APPENDIX D

Waste Discharge Requirement
Monitoring and Reporting Program

SOIL AND WATER RESOURCES – APPENDIX D

MONITORING AND REPORTING PROGRAM-- NextEra Blythe Solar Energy Center, LLC ~~Palo Verde Solar I~~, LLC, Owner/Operator, Blythe Solar Power Project, Riverside County

PART I

GENERAL REQUIREMENTS

A. GENERAL

A Discharger who owns or operates a Class II Surface Impoundment is required to comply with the provisions of Title 27, Division 2, Chapter 3, Subchapter 3, Article 1 of the California Code of Regulations for the purpose of detecting, characterizing, and responding to releases to the groundwater. Section 13267, California Water Code (CWC) gives the Colorado River Basin Regional Water Quality Control Board (Regional Board) authority to require monitoring program reports for discharges that could affect the quality of waters within its region.

1. This Monitoring and Reporting Program (MRP) is Appendix C of the WDRs set forth in Appendices A and B, and are incorporated herein by this reference...The principal purpose of this self-monitoring program is:
   a. To document compliance with Waste Discharge Requirements (WDRs), and prohibitions established by the Regional Board;
   b. To facilitate self-policing by the Discharger in the prevention and abatement of pollution arising from waste discharge;
   c. To conduct water quality analyses.

2. The Regional Board Executive Officer may alter the monitoring parameters, monitoring locations, and/or the monitoring frequency during the course of this monitoring program.

B. DEFINITION OF TERMS

1. Affected Persons – all persons who either own or occupy land outside the boundaries of the parcel upon which a waste management unit (surface impoundment or impoundment) is located that has been or may be affected by the release of waste constituents from the unit.
2. Background Monitoring Point – a device (e.g. well) or location (e.g. a specific point along a lakeshore) that is upgradient or side gradient from the impoundment assigned by this MRP, where water quality samples are taken that are not affected by a release from the impoundment and that are used as a basis of comparison against samples taken from downgradient Monitoring Points.
3. Constituents of Concern – those constituents likely to be in the waste, or derived from waste constituents in the event of a release from the impoundment.

4. Matrix Effect – refers to any change in the Method Detection Limit (MDL) or Practical Quantitation Limit (PQL) for a given constituent as a result of the presence of other constituents - either of natural origin or introduced through a spill or release - that are present in the sample being analyzed.

5. Method Detection Limit (MDL) – the lowest constituent concentration that can support a non-zero analytical result with 99 percent reliability. The MDL is laboratory specific and should reflect the detection capabilities of specific procedures and equipment used by the laboratory.

6. Monitored Media – water - bearing media monitored pursuant to this Monitoring and Reporting Program. The Monitored Media may include: (1) groundwater in the uppermost aquifer, in any other portion of the zone of saturation (as defined in Title 27, Section 20164) in which it would be reasonable to anticipate that waste constituents migrating from the surface impoundment could be detected, and in any perched zones underlying the impoundment, (2) any bodies of surface water that could be measurably affected by a release, (3) soil-pore liquid beneath and/or adjacent to the surface impoundment, and (4) soil-pore gas beneath and/or adjacent to the surface impoundment.

7. Monitoring Parameters – the list of constituents and parameters used for the majority of monitoring activity.

8. Monitoring Point – a device (e.g. well) or location (e.g. a specific point along a lakeshore) that is downgradient from the surface impoundment assigned by this MRP, at which samples are collected for the purpose of detecting a release by comparison with samples collected at Background Monitoring Points.

9. Practical Quantification Limit (PQL) – the lowest constituent concentration at which a numerical concentration can be assigned with a 99 percent certainty that its value is within 10 percent of the actual concentration in the sample. The PQL is laboratory specific and should reflect the detection capabilities of specific procedures and equipment used by the laboratory.

10. Reporting Period – the duration separating the submittal of a given type of monitoring report from the time the next iteration of that report is scheduled for submittal. Unless otherwise stated, the due date for any given report shall be 30 days after the end of its Reporting Period.

11. Sample Locations -

    a. For Monitoring Points – the number of data points obtained from a given Monitoring Point during a given Reporting Period – used for carrying out the statistical or non-statistical analysis of a given analyte during a given Reporting Period.

    b. For Background Monitoring Points – the number of new and existing data points from all applicable Background Monitoring Points in a given Monitored Medium – used to collectively represent the background concentration and variability of a given analyte in carrying out a statistical or non-statistical analysis of that analyte during a given Reporting Period.

12. Uppermost Aquifer – the geologic formation nearest the natural ground surface that is an aquifer, as well as, lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary.

13. Volatile Organic Constituents (VOCs) – the suite of organic constituents having a high vapor pressure. The term includes at least the 47 organic constituents listed in Appendix I to 40 CFR Part 258.

14. VOC_{water} – the composite monitoring parameter that includes all VOCs that are detectable in less than 10 percent of the applicable background samples. This parameter is analyzed, using the non-statistical method described in Part III.A.2. of this MRP, to identify releases of VOCs that are detected too infrequently in backgroundwater to allow for statistical analysis.

C. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analysis shall be performed according to the most recent version of Standard USEPA methods, and California ELAP rulings. Water and waste analysis shall be performed by a laboratory approved for these analyses by the California Department of Public Health. Specific methods of analysis must be identified. If methods other than USEPA-approved methods or Standard Methods are used, the exact methodology must be submitted for review and approval by the Regional Board Executive Officer prior to use. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Regional Board. All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurement. In addition, the Discharger is responsible for verifying that laboratory analysis of all samples from Monitoring Points and Background Monitoring Points meet the following restrictions:

1. Methods, analysis, and detection limits used must be appropriate for expected concentrations. For detection monitoring of any constituent or parameter found in concentrations that produce more than 90% non-numerical determinations (i.e. "trace" or "ND") in data from Background Monitoring Points for that medium, the analytical methods having the lowest "facility-specific method detection limit (MDL)", defined in Part I.B.5., shall be selected from among those methods that provide valid results in light of any "Matrix Effects" (defined in Part I.B.4.) involved.

2. Analytical results falling between the MDL and the PQL shall be reported as "trace", and shall be accompanied both by the estimated MDL and PQL values for that analytical run, and by an estimate of the constituent's concentration.

3. MDLs and PQLs shall be derived by the laboratory for each analytical procedure, according to State of California laboratory accreditation procedures. These MDLs and PQLs shall reflect the detection and quantitation capabilities of the specific equipment used by the lab. If the lab suspects that, due to a change in matrix or other effects, the true detection limit or quantitation limit for a particular analytical run differs significantly from the laboratory-derived MDL/PQL values, the results shall be flagged accordingly, along with an estimate of the detection limit and quantitation limit actually achieved.

4. All Quality Assurance/Quality Control (QA/QC) data shall be reported, along with the sample results to which it applies, including the method, equipment, and analytical

detection limits, the recovery rates, an explanation of any recovery rate that is less than method recovery standards, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analysis, and the name and qualifications of the person(s) performing the analyses. Sample results shall be reported unadjusted for blank results or spike recovery.

5. Upon receiving written approval from the Regional Board Executive Officer, an alternative statistical or non-statistical procedure can be used for determining the significance of analytical results for a constituent that is a common laboratory contaminant (i.e., methylene chloride, acetone, diethylhexyl phthalate, and di-n-octyl phthalate) during any given Reporting Period in which QA/QC samples show evidence of laboratory contamination for that constituent. Nevertheless, analytical results involving detection of these analytes in any background or downgradient sample shall be reported and flagged for easy reference by Regional Board staff.

6. In cases where contaminants are detected in QA/QC samples (i.e. field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged.

7. The MDL shall always be calculated such that it represents a concentration associated with a 99% reliability of a non-zero result.

D. RECORDS TO BE MAINTAINED

Written reports shall be maintained by the Discharger or laboratory, and shall be retained for a minimum of five (5) years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Board. Such records shall show the following for each sample:

1. Identity of sample and of the Monitoring Point or Background Monitoring Point from which it was taken, along with the identity of the individual who obtained the sample;

2. Date and time of sampling;

3. Date and time that analyses were started and completed, and the initials of the personnel performing each analysis;

4. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;

5. Calculations of results; and

6. Results of analyses, and the MDL and PQL for each analysis.

E. REPORTS TO BE FILED WITH THE REGIONAL BOARD

1. Detection Monitoring Reports – For each Monitored Medium, all Monitoring Points and Background Monitoring Points assigned to detection monitoring under Part II.A.7 of this MRP shall be monitored **semiannually** for the Monitoring Parameters (Part II.A.4). A “Detection Monitoring Report” shall be submitted to the Regional Board in accordance with the schedule contained in the Summary of Self-Monitoring and Reporting Requirements, and shall include the following:

    a. A Letter of Transmittal that summarizes the essential points in each report shall accompany each report submittal. The letter of transmittal shall be signed by a principal executive officer at the level of vice-president or above, or by his/her duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates. The letter of transmittal shall include:

i. A discussion of any violations noted since the previous report submittal and a description of the actions taken or planned for correcting those violations. If no violations have occurred since the last submittal, that should be so stated;

ii. If the Discharger has previously submitted a detailed time schedule or plan for correcting any violations, a progress report on the time schedule and status of the corrective actions being taken; and

iii. A statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct.

b. A Compliance Evaluation Summary shall be included in each Detection Monitoring Report. The compliance evaluation summary shall contain at least:

i. Velocity and direction of groundwater flow for each monitored groundwater body under and around the surface impoundment based upon the water level elevations taken during the collection of water quality data. A description and graphical presentation (e.g., arrow on a map) shall be submitted;

ii. Methods used for water level measurement and pre-sampling purging for each monitoring well addressed by the report including:

1. Method, time, and equipment used for water level measurement;

2. Type of pump used for purging, placement of the pump in the well, pumping rate, and well recovery rate;

3. Methods and results of field testing for pH, temperature, electrical conductivity, and turbidity, including;

a. Equipment calibration methods, and

b. Method for disposing of purge water

iii. Methods used for sampling each Monitoring Point and Background Monitoring Point, including:

1. A description of the type of pump, or other device used, and its placement for sampling;

2. A detailed description of the sampling procedure: number and description of samples, field blanks, travel blanks, and duplicate samples; types of containers and preservatives used; date and time of sampling; name and qualifications of individual collecting samples, and other relevant observations;

c. A map or aerial photograph showing the locations of Monitoring Points, and Background Monitoring Points;

d. For each Detection Monitoring Report, provide all relevant laboratory information including results of all analyses, and other information needed to demonstrate compliance with Part I.C.;

e. An evaluation of the effectiveness of the run-off/run-on control facilities;

f. A summary of reportable spills/leaks occurring during the reporting period; include estimated volume of liquids/solids discharged outside designated containment area, a description of management practices to address spills/leaks, and actions taken to prevent reoccurrence.

2. Annual Summary Report – The Discharger shall submit to the Regional Board, an "Annual Summary Report" for the period extending from January 1 through December 31. The "Annual Summary Report" is due **March 15** of each year, and shall include the following:

a. A graphical presentation of analytical data for each Monitoring Point and Background Monitoring Point (Title 27, Section 20415(e)(14)). The Discharger shall submit, in graphical format, the laboratory analytical data for all samples taken within at least the previous five (5) calendar years. Each such graph shall plot the concentration of one (1) or more constituents over time for a given Monitoring Point and Background Monitoring Point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. For any given constituent or parameter, the scale for background plots shall be the same as that used to plot downgradient data. On the basis of any aberrations noted in the plotted data, the Regional Board Executive Officer may direct the Discharger to carry out a preliminary investigation (Title 27, Section 20080(d)(2)), the results of which will determine whether or not a release is indicated;

b. A tabular presentation of all monitoring analytical data obtained during the previous two (2) Monitoring and Reporting Periods, submitted on hard copy within the annual report as well as digitally on electronic media in a file format acceptable to the Regional Board Executive Officer (Title 27, Section 20420(h)). The Regional Board regards the submittal of data in hard copy and on diskette CD-ROM as "...a form necessary for..." statistical analysis in that this facilitates periodic review by the Regional Board statistical consultant;

c. A comprehensive discussion of the compliance record and any corrective actions taken or planned, which may be needed to bring the Discharger into full compliance with WDRs;

d. A written summary of the groundwater analyses, indicating changes made since the previous annual report; and

e. An evaluation of the effectiveness of the run on/run-off control facilities, pursuant to Title 27, Section 20365.

3. Contingency Reporting

a. The Discharger shall report any spill of ~~HTL or~~ evaporation pond liquid by telephone within 48 hours of discovery. The reportable quantity for evaporation pond liquid is 150 gallons.

After reporting a spill, a written report shall be filed with the Regional Board Executive Officer within seven (7) days, containing at a minimum the following:

i. A map showing the location(s) of the discharge/spill;

ii. A description of the nature of the discharge (all pertinent observations and analyses including quantity, duration, etc.); and

iii. Corrective measures underway or proposed.

b. Should the initial statistical comparison (Part III.A.1.) or non-statistical comparison (Part III.A.2.) indicate, for any Constituent of Concern or Monitoring Parameter, that a release is tentatively identified, the Discharger shall immediately notify the Regional Board verbally as to the Monitoring Point(s) and constituent(s) or parameter(s) involved, shall provide written notification by certified mail within seven (7) days of such determination (Title 27, Section 20420(j)(1)), and shall conduct a discrete retest in accordance with Part III.A.3. If the retest confirms the existence of a release, the Discharger shall carry out the requirements of Part I.E.3.d. In any case, the Discharger shall inform the Regional Board of the outcome of the retest as soon as the results are available, following up with written results submitted by certified mail within seven (7) days of completing the retest.

c. If either the Discharger or the Regional Board determines that there is significant physical evidence of a release (Title 27, Section 20385(a)(3)), the Discharger shall immediately notify the Regional Board of this fact by certified mail (or acknowledge the Regional Board's determination) and shall carry out the requirements of Part I.E.3.d. for all potentially-affected monitored media.

d. If the Discharger concludes that a release has been discovered:

i. If this conclusion is <u>not</u> based upon “direct monitoring” of the Constituents of Concern, pursuant to Part II.A.5., then the Discharger shall, within thirty days, sample for all Constituents of Concern at all Monitoring Points and submit them for laboratory analysis. Within seven (7) days of receiving the laboratory analytical results, the Discharger shall notify the Regional Board, by certified mail, of the concentration of all Constituents of Concern at each Monitoring Point. Because this scan is not to be tested against background, only a single datum is required for each Constituent of Concern at each Monitoring Point (Title 27 Section 20420(k)(1));

ii. The Discharger shall, within 90 days of discovering the release (Title 27, Section 20420(k)(5)), submit a Revised Report of Waste Discharge proposing an Evaluation Monitoring Program meeting the requirements of Title 27, Section 20425; and

iii. The Discharger shall, within 180 days of discovering the release (Title 27, Section 20420(k)(6), submit a preliminary engineering feasibility study meeting the requirements of Title 27, Section 20430.

e. Any time the Discharger concludes - or the Regional Board Executive Officer directs the Discharger to conclude - that a liquid phase release from the surface impoundment has proceeded beyond the facility boundary, the Discharger shall so notify all persons who either own or reside upon the land that directly overlies any part of the plume (Affected Persons).

i. Initial notification to Affected Persons shall be accomplished within 14 days of making this conclusion and shall include a description of the Discharger's current knowledge of the nature and extent of the release; and

ii. Subsequent to initial notification, the Discharger shall provide updates to all Affected Persons, including any persons newly affected by a change in the boundary of the release, within 14 days of concluding a material change in the nature or extent of the release has occurred.

4. <u>Surface Impoundment - Leakage Detection System (LDS), and Solids Monitoring</u>

   a. Sampling and reporting shall be conducted semi-annually.

   b. Provide volume of solids removed from the holding pond each month for that reporting period, and transported to a waste management facility for disposal. Include name and location of waste management facility.

   c. Conduct quarterly inspections of Leakage Detection System (LDS), and holding pond.

TRAFFIC & TRANSPORTATION

John Hope

THIS SECTION WILL BE PROVIDED IN THE

STAFF ASSESSMENT – Part B

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The applicant, NextEra Blythe Solar Energy Center, LLC (NextEra Blythe Solar), proposes to modify the Energy Commission-approved Blythe Solar Power Project (BSPP) to generate its energy using photovoltaic (PV) technology instead of the approved parabolic trough technology. The generated energy would still be transmitted to the Southern California Edison's (SCE's) transmission grid through SCE's Colorado River Substation currently under construction approximately five miles southwest of the site. As with the approved BSPP, the proposed tie-in line would be a single-circuit 230-kilovolt (kV) transmission line connecting the project's on-site 230-kV switchyard to the SCE Colorado River Substation. This substation is under the jurisdiction of the California Public Utilities Commission (CPUC) and the Bureau of Land management (BLM); therefore, staff's analysis for the approved project was for the proposed tie-in project line as it stretches from the on-site substation and ends at the SCE substation. The route and construction plan for the amended project's line would remain essentially the same as for the approved project meaning that the field and non-fields would be encountered at the same levels as with the approved project. These impacts would remain below levels of potential significance and staff does not recommend any changes to the five conditions of certification as already approved.

INTRODUCTION

The purpose of this staff assessment is to assess the need to modify the five conditions of certification that have been proposed for the approved Blythe Solar Power Project's given the present proposal to modify its power generation technology from the parabolic trough technology to the photovoltaic technology and reducing the physical size of the project in the process. These conditions of certification were aimed at the transmission line's design and operational plan to ensure that its related field and nonfield impacts would not constitute a significant environmental hazard in the areas around the proposed route. As with the approved project the modified project would consist of four units (Units #1 through Unit # 4) generating a total of 485 megawatts which would be much less than the 1000 megawatts proposed for the approved project.

The generated power would be transmitted from the project's on-site switchyard to SCE's Colorado River Substation using the same overhead single-circuit 230-kilovolt (kV) line proposed for the approved project. This SCE substation is currently under construction approximately five miles to the southwest and is under the jurisdiction of the CPUC and the BLM. This staff analysis is for the tie-in line and the related on-site switchyard as proposed for the modified project. As with the approved project, the portion of the line within the project's boundaries would be built together with the on-site switchyard and operated by the applicant while the segment outside the boundaries would be built and operated by SCE (NEBS2013a, p. 2-2). Since the proposed project-related line would be built and operated within the SCE service area, both segments would be designed, built, and operated according to SCE's guidelines. The potential impacts of concern in this analysis are those to be encountered along the corridor between the modified project site and the SCE Colorado River Substation. All related health and safety laws, ordinances, regulations, and standards (LORS) are currently aimed at minimizing the hazards from building and operating such a line along any given 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.

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.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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.
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 and requires mitigation of any interference by the owner of the source.
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.

Applicable LORS	Description
Electric and Magnetic Fields	
State	
GO-131-D, CPUC ”Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California”	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR sections 1250-1258, “Fire Prevention Standards for Electric Utilities”	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

PROPOSED PROJECT

SETTING AND EXISTING CONDITIONS

As discussed by the applicant (NEBS 2013a, pp.2-2 through 2-7), the four units of the approved project would occupy a total of 7036 acres of federal land currently managed by the BLM. The modified project would occupy only 4,070 acres of the same undeveloped desert land parcel approximately two miles north of Interstate 10, and eight miles west of the city of Blythe in Riverside County. As with the approved project, each of the four units of the modified project would produce its own solar power and 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 the same SCE Colorado Substation approximately five miles southwest of the site. As with the approved project, the proposed route would proceed directly south from the project site, eventually crossing over Interstate 10 and turning westward to the connection point at the SCE Colorado River Substation. Since the operating SCE Colorado Substation would be under the jurisdiction of the CPUC, it is presently being built, and would be operated according to SCE guidelines as required under existing LORS.

The proposed project site is in an uninhabited open desert land with no existing structures. As with the approved project, the available land for the line’s right-of-way would traverse BLM-administered land with only two residences within two miles (NEBS 2013a, p.2-2). The general absence of residences in the immediate vicinity means that there would not be the type of residential field exposure that has been of health concern in recent years.

PROJECT DESCRIPTION

As with the approved project, the 230-kV tie-in line for the modified project would consist of the following individual segments:

- A new, single-circuit 230-kV overhead transmission line extending the 5 miles from the on-site project switchyard to the SCE Colorado River Substation to the southwest; and
- The project's on-site 230-kV switchyard from which the conductors would extend to the Colorado River Substation.

The conductors would be aluminum steel-reinforced cables supported on steel pole structures placed between 800 feet and 1,200 feet apart and with heights of from 90 feet to a maximum of 145 feet except near the airport where they would be shorter in compliance with Federal Aviation Administration (FAA) requirements and the applicable guidelines of the Riverside County Airport Land Use Commission (RCALUC). The width of the right-of-way would be approximately 120 feet or 250 feet depending on the size of the pole structure. The details of the proposed support structures are as provided for the approved project regarding line safety, maintainability, and field reduction efficiency (NEBS 2013a, pp. 2-5 and 2-14).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

DIRECT AND INDIRECT 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 specify the criteria for determining when to notify the FAA about such hazards. As noted for the approved project, these regulations require FAA notification in cases of structures over 200 feet from the ground (NEBS 2013a, pp. 2-14 and 2-15). 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 project site is located one mile north of the Blythe Airport triggering specific height restrictions on the line's structures to prevent collision hazards for utilizing aircraft in an identified 3,900-foot segment. To minimize this hazard the proposed line structures would be below the 90 feet specified for the other segment as necessary for compliance with the height restrictions required under FAA regulations and the guidelines of the Riverside County Airport Land Use Commission as previously noted. A "Notice of Proposed Construction and Alteration (Form 7460) was submitted to the FAA for the approved project lines. The FAA conducted its safety analysis and concluded that the project's transmission line would not pose an aviation hazard to area aircraft as proposed. The design, routing, and operating plan for the modified project would remain essentially the same. The issue of aviation safety is further discussed in the **Traffic and Transportation** section.

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. Because of the power loss from such corona discharges, it is in the interest of each line proponent to employ design, construction and maintenance plans that minimize them. When generated, such corona noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication when the signal is amplitude modulated (AM). Such radio interference is the buzzing and crackling noise one might hear from the speaker of amplitude modulated (AM) broadcast receiver when near a transmission line. Frequency modulated (FM) signals are normally unaffected as are modern digital signals such as those involved in cellular telephone and microwave communication or modern airport and other types of digital radio communication. Since the level of the AM interference in any given case would depend on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such AM interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas. The Federal Communictions Commission (FCC) requires the line's owner to mitigate such interference in any specific case.

The proposed project line would be designed, built and maintained in keeping with standard SCE practices that minimize surface irregularities and discontinuities and related corona noise. Such corona effects would further be minimized by the specific low-corona designs proposed for the approved project. Since the line would traverse an uninhabited open space and would not interfere with modern digital air port-related communications, staff does not expect any related complaints. However, staff recommends Condition of Certification **TLSN-2** to ensure mitigation as required by the FCC in the unlikely event of complaints.

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 could be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, mainly from overhead lines of 345 kV or higher and is therefore not expected from the proposed 230-kV line. Research by the Electric Power Research Institute (EPRI 1982) has validated the efficacy of available mitigation measures by showing that the fair-weather audible noise from all modern transmission lines even of more than 345 kV would be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the proposed low-corona design is also aimed against surface electric fields gradients, 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 and Vibration** 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 (NEBS 2013a, p. 2-14). The applicant's intention to ensure compliance with the clearance-related aspects of General Order (GO)-95 would be an important part of this mitigation approach. Condition of Certification **TLSN-4** 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 (NEBS 2013a, p. 2-14) 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 (NEBS2013a, p. 2-14). Staff recommends Condition of Certification **TLSN-5** to also ensure such grounding for the modified project

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 one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. 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 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 route of the proposed project line would have no nearby residences, the long-term residential field exposures at the root of the health concern of recent years would not be a significant concern for the line. The field strengths of most significance in this regard would be as encountered at the edge of the line's right-of-way. These field intensities would depend on the effectiveness of the applied field-reducing measures. The applicant (NEBS 2013a, p. 2.14 and Appendix D) calculated the maximum electric and magnetic field intensities expected along the route for the proposed line design. 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 as1.85 kV/m at the edge of the 150-foot right-of-way and is similar to the intensity of SCE lines of similar design and voltage rating. The maximum magnetic field intensity of approximately 50.5 mG at the edge of this right-of-way is also similar to that of SCE lines of similar voltage rating and 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-3** for field strength measurements are intended to validate the applicant's assumed reduction efficiency.

CLOSURE AND DECOMMISSIONING IMPACTS AND MITIGATION

If the proposed modified project 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.

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).

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-3**.

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-3**.

PUBLIC AND AGENCY COMMENTS

Comment: In its staff report the Airport Land Use Commission of the County of Riverside noted the potential impacts of the proposed transmission line on operation of the Blythe Airport and the appropriateness of further hearings to address airport land use compatibility as related to (a) potential interference with the navigational system utilized at the Blythe Airport and (b) collision hazard posed by the line to aircraft. The Airport Commission staff report suggested undergrounding of the proposed line as a mitigation measure.

Staff's Response: The transmission line location and characteristics for the modified project are the same as the originally licensed project; therefore the location of the line is not subject to additional review. Regardless, staff concurs with its previous finding that the transmission line would not pose a safety risk at the Blythe Airport. During the original licensing proceeding the transmission line was specifically moved further west to increase the distance from the Airport. In addition to staff's assessment the FAA conducted its safety analysis and concluded that the project's transmission line would not pose an aviation hazard to area aircraft. As staff noted in discussing the potential for radio-frequency interference, the proposed line design would be adequate to prevent any operations-related interference with radio communication in the immediate vicinity whether in the uninhabited areas or within the Blythe Airport. The Blythe Airport communications equipment is operated at frequencies not subject to interference by the power-frequency fields from the proposed lines. In addition, FCC regulations require each line owner to mitigate such impacts. Staff continues to recommend **TLSN-2** to ensure such mitigation in the unlikely event of complaints and does not recommend a requirement for further mitigation such as running lines underground.

Please see the **Traffic and Transportation** section for additional discussion of the aviation hazard from the physical presence of the proposed project line in the vicinity of the Blythe Airport.

Comment: In an e-mail to the Energy Commission dated August 30, 2013 Mr. Lin Porter (an area property owner) expressed specific concerns about the route of the BSPP transmission line as proposed. Mr. Porter included several pages of articles from the internet on the health and other environmental effects of line EMF as further support for his preference for routing the line further away from his property boundaries. He then expressed his readiness to lease his 160.54-acre parcel at issue to the project owner as a way of eliminating the EMF impacts that might be encountered within his property boundaries.

Staff's Response: As previously noted, the transmission line location and characteristics for the modified project are the same as for the originally licensed project. Since the modified project line would be operated at 230 kV instead of the 500 kV for the licensed project, the line's electric field-related impacts as discussed in this staff analysis would be proportionately less for the modified line. Staff agrees with Mr. Porter that there is continuing concern about the potential health and other environmental impacts from line EMF. We considered these concerns and related scientific uncertainties in our five recommended conditions for certification and do not recommended further changes to the proposed design, routing and operational plan. Based on the current scientific understanding of EMF and potential health impacts, utility practices with transmission lines and the reduction in line voltage, the recommended mitigation is adequate to protect human health and safety and we do not recommended further changes to the proposed design, routing and operational plan.

NOTEWORTHY PUBLIC BENEFITS

Since the proposed project tie-in line would pose a 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.

CONCLUSIONS

As with the approved project, potential for nuisance shocks would be minimized for the modified project 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 BSPP 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 absence of residences along 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 nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable LORS. With implementation of the five recommended conditions of certification, any such impacts would be less than significant.

PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

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

Verification: At least 30 days before starting 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 ensure that every reasonable effort will be made to identify and correct, on a case-specific basis, any complaints of interference with radio or television signals from operation of the project-related line and associated switchyards.

Verification: All reports of line-related complaints shall be summarized for the project-related lines and included during the first five years of plant operation in the Annual Compliance Report.

TLSN-3 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-4 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.

<u>Verification:</u> 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.

TLSN-5 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.

<u>Verification:</u> At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

REFERENCES

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.

NEBS 2013a. NextEra Blythe Solar Energy Center, LLC (TN:70318). Revised Petition to Amend (Conversion to PV). Dated April 12, 12, 2013. Submitted to the CEC on April 12, 2013.

VISUAL RESOURCES

Mark Hamblin

THIS SECTION WILL BE PROVIDED IN THE

STAFF ASSESSMENT – Part B

WASTE MANAGEMENT

Testimony of Christopher Dennis, PG

SUMMARY OF CONCLUSIONS

The proposed amended Blythe Solar Power Project would employ photovoltaic technology (PV), which would eliminate the existing approved parabolic trough technology and need for heat transfer fluid (HTF). With the elimination of HTF and the waste management requirements related to this fluid, condition of certification **WASTE-8** is no longer required.

Management of the non-hazardous and hazardous waste generated during construction, operation, and closure of the modified Blythe Solar Power Project (Modified BSPP) would not result in significant adverse impacts under the California Environmental Quality Act (CEQA) guidelines (Appendix G: Environmental Checklist Section XVI - Utilities and Service Systems). The Modified BSPP would be consistent with applicable waste management laws, ordinances, regulations, and standards (LORS) provided that the measures proposed by the applicant and mitigation proposed by Energy Commission staff (staff) are implemented.

INTRODUCTION

This section presents an analysis of the potential adverse environmental impacts and LORS compliance related to the wastes that would be generated by the Modified BSPP during construction, operation, and eventual closure. Management and discharge of wastewater is addressed in the **Soil and Water Resources** section of this document. Additional information related to waste management may be provided in the **Worker Safety and Fire Protection** and **Hazardous Materials Management** sections of this document.

The objectives of this analysis are to evaluate whether:

1. The Modified BSPP generated wastes would be managed in compliance with all applicable LORS;
2. To ensure that wastes generated during the Modified BSPP construction, operation, and closure would be managed and disposed of in an environmentally safe manner and would not significantly and adversely impact existing waste disposal facilities; and
3. To ensure that the Modified BSPP generated wastes and waste constituents would not pose a significant risk to humans or the environment.

METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Staff analyzed the expected direct, indirect, and cumulative impacts that would be caused by management of waste generated during construction, operation, and closure of the Modified BSPP. This analysis includes an evaluation of the potential impact of existing contamination associated with prior site activities on or near the Modified BSPP site and impacts from the generation and management of wastes during demolition of existing structures and during project construction and operation. If potential impacts related to the proposed project would be negative and significant, staff has recommended mitigation to avoid or reduce the effect of those impacts to a level of less than significant.

Staff's analysis includes review of a Phase I Environmental Site Assessment (ESA) submitted as part of the project application for certification. This ESA was updated as part of this proposed project amendment. A Phase I ESA evaluates existing and potential site contamination. The evaluation is performed by a qualified environmental professional who inquires into past uses and ownership of the property, researches hazardous substance releases and hazardous waste disposal at the site and within a certain distance of the site, and visually inspects the property to observe potential contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the environmental professional then provides a report of findings about the environmental conditions at the site.

Because the Phase I ESA does not include sampling or testing, the environmental professional may 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 extent and concentration of contamination. Based on this information, remediation plans, if necessary, can be developed.

If potential or existing releases or contamination is identified, the CEQA significance of the release or contamination is to be determined by site-specific factors, which include:

- The amount and concentration of contaminants or contamination;
- The proposed use of the area where the contaminants/contamination is found; and,
- Any potential contaminant exposure pathways to workers, the public, or sensitive species or environmental areas.

Unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors are considered a significant adverse impact.

Staff also analyzed project compliance with the local, state, and federal LORS. LORS compliance is a major component of the determination regarding the significance and acceptability of the proposed project with respect to management of waste.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local LORS have been established to ensure the safe and proper management of both non-hazardous and hazardous wastes. These LORS are designed 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.
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.

Applicable Law	Description
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.
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.

Applicable Law	Description
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.
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.

Applicable Law	Description
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 (AB 939)	The California Integrated Waste Management Act (CIWMA) (AB 939) sets mandates and standards for management of solid waste in California for local jurisdictions (cities and counties) and the state. AB 939 sets landfill diversion requirements; a preferred waste management hierarchy (source reduction first, then recycling and reuse, and treatment and disposal last); standards for design and construction of municipal landfills; and programs for county waste management plans and local implementation of solid waste requirements. AB 939 is designed to reduce the volume and toxicity of solid waste landfilled and incinerated by requiring local governments to prepare and implement plans to improve the management of waste resources. AB 939 set out the requirement to reduce the amount of solid waste disposed in landfills and transformed by 50 percent by the year 2000 and every year thereafter, through source reduction, recycling, and composting.
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.
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.

Applicable Law	Description
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 Integrated Waste Management Program	The Countywide Integrated Waste Management Plan (CIWMP) was prepared in accordance with the California Integrated Waste Management Act of 1989, Chapter 1095 (AB 939) to ensure the County's compliance with the requirements of AB 939.
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.

PROPOSED MODIFIED PROJECT

The Modified BSPP site is located approximately two miles north of U.S. Interstate Highway 10 (I-10) and eight miles west of the City of Blythe in Riverside County, California (NEBS, 2013a). The site is located on vacant, undeveloped public land administered by the Bureau of Land Management (BLM), and the Modified BSPP facility would occupy approximately 4,070 acres. The modified project would replace solar thermal technology with PV generating technology. However, the PV module type (silicon or cadmium telluride) and foundation type (tracker and/or fixed tilt) have not been identified by the project owner. Modifying the project to PV technology would eliminate the need for the following:

- Four power blocks and the associated steam turbines, auxiliary boilers, air-cooled condensers, and other equipment and structures;
- Land Treatment Units for HTF;
- Parabolic trough energy collection systems and associated HTF piping systems;
- large drainage control channels;
- Large assembly hall;
- Concrete batch plant; and
- Natural gas pipeline.

In addition, the following project features would be reduced:

- Power plant footprint size reduced from approximately 6,831 acres to 4,070 acres, and modified to allow transmission and access road corridors to accommodate the McCoy Solar Energy Project and the McCoy Solar project proposed to the north of the Modified BSPP;

- Amount of mass grading greatly reduced;
- Construction water use reduced from approximately 4,100 acre-feet (AF) to 700 to 1,200 AF;
- Number of evaporation ponds reduced from eight to two (from 32 acres to up to 12 acres);
- Operational water use from up to 600 AF per year (AF/y) to up to 40 AF/y;
- Water treatment system reduced in size; and,
- Storm water drainage system reduced in size.

The proposed gen-tie line to Southern California Edison's Colorado River Substation would remain unchanged.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This waste management analysis addresses the existing project site conditions and the potential for contamination associated with prior activities on or near the project site, and the potential impacts from the generation and management of wastes during project construction, operation, and closure.

EXISTING PROJECT SITE CONDITIONS AND POTENTIAL FOR CONTAMINATION

The project site was subject to a Phase I ESA in 2009 (PVSI, 2009a). This ESA was updated in June 2013, in accordance with update requirements in ASTM E 1527-05.[1] (NEBS, 2013e). A similar Phase I ESA was completed in 2011 for the McCoy Solar Energy project located adjacent to the Modified BSPP. Based on these ESA results, no recognized environmental concerns (RECs) are identified in connection with the Modified BSPP site (NEBS, 2013e).

The 2013 Phase I ESA update reported (NEBS, 2013e):

- No buildings or structures.
- The Modified BSPP site is vacant desert, with the exception of the power lines on the northeastern side.
- No visual evidence of dry wells, clarifiers, or septic systems.
- Four water and/or monitoring wells.
- One empty, dry concrete water cistern near the wells and in association with three former rock and mortar structures that only had portions of the walls and concrete foundations remaining.
- No visual evidence of discolored soil, water, or unusual vegetative conditions or odors.

[1] These provisions require an ESA to be updated within a year if a new project is proposed for the property on which the initial ESA was prepared.

- Miscellaneous trash and debris is significantly less than what was observed in 2009.
- Approximately 10 percent of the Modified BSPP site has been disturbed and/or graded as part of previous solar development plans.

Unexploded Ordnance (UXO) is present at the Modified BSPP site (NEBS, 2013e). The 2009 Phase I ESA recommended geophysical survey investigations of the potential UXO by a company with specific expertise in UXO identification, and recommended that remnants of munitions or bullets identified during development of the subject property be removed and disposed of in accordance with applicable LORS (NEBS, 2013e). Staff proposes existing condition of certification **WASTE-1**, which would require UXO training, investigation, removal, and disposal.

In the event that contamination is identified during any phase of construction, existing condition of certification **WASTE-2** requires the availability of an experienced and qualified Professional Engineer or Professional Geologist for consultation. If contaminated soil is identified, existing condition of certification **WASTE-3** requires 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 California Department of Toxic Substances Control (DTSC) with findings and recommended actions. The recommended action could include excavation of the contaminated soil. Excavated 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. Removal of any equipment, including potential remediation activities, would be conducted in accordance with applicable LORS. Staff believes that existing 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.

IMPACTS FROM GENERATION AND MANAGEMENT OF WASTES DURING PROJECT CONSTRUCTION, OPERATION, AND CLOSURE

Handling and management of waste generated by the Modified BSPP 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 involves reusing or recycling wastes. For wastes that cannot be recycled, treatment is to be used, if possible, to make the waste nonhazardous. Finally, waste that cannot be reused, recycled, or treated is to be transported off site to a permitted treatment, storage, or disposal facility.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The Integrated Waste Management Act of 1989 [Assembly Bill (AB) 939, Sher, Chapter 1095, Statutes of 1989] set landfill waste diversion goals for local jurisdictions of 50 percent by the year 2000. To meet this goal, many jurisdictions require applicants for construction and demolition projects to submit a reuse/recycling plan for at least 50 percent of construction and demolition materials prior to the issuance of a building or demolition permit. While Riverside County does not have such a requirement, staff encourages the project owner to meet the 50 percent waste diversion rate.

Construction

Site preparation and construction of the Modified BSPP would last approximately 48 months and generate non-hazardous, universal, and hazardous wastes in solid and liquid forms. Based on estimates by the project owner, these waste streams and volumes generated by the modified project would be roughly the same as those of the original project (NEBS, 2013a). Before construction begins, the project owner would be required to develop and implement a Construction Waste Management Plan to ensure that waste is recycled when possible and properly landfilled as necessary. This plan would also include procedures for disposal or recycling procedures for PV modules damaged or broken during construction. Existing condition of certification **WASTE-4** requires the project owner to submit a Construction Waste Management Plan to the CPM at least 30 days prior to the start of construction activities.

Non-hazardous solid wastes generated during the Modified BSPP construction would consist of scrap wood, rock, sand, concrete, metals, glass, plastic, paper, insulating materials, oil filters, sanitary, and food waste. The composition and volume of the Modified BSPP non-hazardous construction waste would not differ significantly from that of the original project. 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.

Universal waste generated during construction would include spent alkaline batteries and fluorescent or mercury vapor lamps. The spent batteries and lamps would be recycled or disposed of by licensed universal waste handlers. Universal waste would be accumulated for less than one year and recycled off site.

The project owner would select PV modules made of cadmium telluride (CdTe) thin film technology or crystalline silicon (NEBS, 2013a). If the project owner selects CdTe modules, the project owner has committed to participating in the manufacturer's recycling program for damaged or broken PV modules. This decision is consistent with new regulations under final approval by the DTSC (DTSC, 2013). The final phase of DTSC rulemaking classifies PV modules as universal waste that requires recycling. This new regulation is scheduled to become effective January 1, 2014. If the DTSC regulation is not finalized, then the project owner would have to test the CdTe material before disposal to a Class III or Class I landfill. If silicon modules were selected, damaged or broken silicon modules would be recycled or disposed of at a Class III landfill.

Hazardous waste generated during construction would include empty hazardous material containers, spent lead-acid batteries, solvents, cleaning chemicals, used oil and lube, paint, adhesives, oil sorbent, oily rags, and spent welding materials. This hazardous construction waste would be less than that of the original project. Empty hazardous material containers would be returned to the vendor or disposed of at a hazardous waste facility. Spent lead-acid batteries, solvents, cleaning chemicals, used oils and lube, paint, adhesives, oil sorbent, oily rags, and spent welding materials would be disposed of at a hazardous waste facility, recycled, or used for energy recovery.

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 Modified BSPP project owner/operator could be considered the generator of hazardous wastes at the site. The Modified BSPP project owner would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction, in compliance with California Code of Regulations, Title 22, Division 4.5. Existing condition of certification **WASTE-5** would require the Modified BSPP project owner to submit the notification and issued identification number documentation to the CPM prior to construction activity.

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 disposal facility by licensed hazardous waste collection and disposal firm. 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 existing condition of certification **WASTE-6** to notify the CPM whenever the owner becomes aware of such action.

Wastewater would be generated during construction, and would include sanitary waste and equipment wash water. Sanitary waste would be contained in portable facilities and routinely disposed of at an offsite treatment/disposal facility by a sanitary service. 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 further analysis of construction wastewater.

Operation

The proposed modified project would generate non-hazardous, universal, and hazardous wastes in solid and liquid forms under normal operating conditions. Based on estimates by the project owner, these waste streams and volumes generated by the modified project would be less than those of the original project.

In accordance with existing condition of certification **WASTE-7**, the project owner would be required to develop and implement an Operations Waste Management Plan. This plan would ensure that operational wastes are treated in compliance with all LORS and that an accurate record of the Modified BSPP waste generation, storage, and disposal practices is maintained. The plan would include procedures for disposal or recycling procedures for PV modules damaged or broken during plant operation.

The Modified BSPP would generate non-hazardous waste, such as oil filters, oily rags, oil sorbents, sodium hypochlorite (12.5 percent solution) and domestic and office wastes (office paper, newsprint, aluminum cans, plastic, and glass). All non-hazardous solid wastes would be recycled, to the maximum extent possible, and non-recyclable wastes would be regularly transported off site to a solid waste disposal facility.

Project operations would also generate universal waste, including spent batteries (e.g., alkaline dry cell, nickel-cadmium, or lithium ion) and spent fluorescent bulbs. Universal waste would be accumulated for less than one year and recycled off site. As discussed above, the project owner will select PV modules made of CdTe or silicon (NEBS, 2013a). If the project owner selects CdTe modules, broken or damaged modules would be delivered to the manufacturer's recycling program. Silicon modules, if damaged or broken, would be recycled or disposed of at Class III landfill.

Hazardous wastes generated during project operations would include used lubricating oil/grease, hydraulic fluids, solvents, paint, adhesives, and spent lead-acid batteries. Used oils and grease would be recycled. Effluent from the oil-water separation system would be recycled. Hydraulic fluid, solvents, paint, adhesives, and lead-acid batteries would be sent offsite for recovery or disposal at a Class I landfill. No HTF-related wastes would be generated. Therefore, condition of certification **WASTE-8** is no longer required.

The Modified BSPP project owner would be considered the generator of hazardous wastes during facility operations. The hazardous waste generator identification number that would be required before the start of construction would be the same identification number used during project operations as required by existing condition of certification **WASTE-5**.

Proper hazardous material handling, good housekeeping practices, and personnel training would help keep spill wastes to a minimum. To ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, existing condition of certification **WASTE-9** requires 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 modified 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 existing condition of certification **WASTE-6** to notify the CPM when advised of any such action.

Non-hazardous liquid wastes would be generated during facility operations would include sanitary wastewater. This wastewater would be piped to an on-site septic system and leach field. To remove minerals from groundwater for non-drinking water purposes, either a reverse osmosis/electrodeionization (RO/EDI) system or a deep bed demineralizer system would be used. A RO/EDI system would generate wastewater, which would be discharged to evaporation ponds. RO system concentrate could be used for dust control, if determined to be inert, or could be disposed of at a permitted waste management facility. A deep bed demineralizer would not produce wastewater, but would require periodic replacement of the deep bed units. Please see the **Soil and Water Resources** section of this document for further analysis of operation wastewater.

Closure

The closure of the proposed modified project would produce both hazardous and non-hazardous solid and liquid waste. The project owner did not identify waste streams or quantities of materials requiring disposal from closure. Required elements of a facility's non-operation and closure are outlined in a repair/restoration plan and facility closure plan as specified in proposed conditions of certification **COMPLIANCE-14** and **-15**. To ensure adequate review of a planned project closure, the Modified BSPP project owner would be required to submit a proposed facility closure plan to the CPM 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 would 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. In addition, the plan would identify landfills with adequate capacity to receive closure generated wastes. Conditions of certification **WASTE-1** through **-10,** excluding **WASTE-8**, would apply to the proposed modified project during closure of the Modified BSPP.

Impact on Existing Waste Disposal Facilities

Based on information provided by the project owner (NEBS, 2013a) and other similarly sized solar projects, staff estimated the following construction and operation non-hazardous waste and hazardous waste volume estimates:

- Construction non-hazardous waste (8,528 cubic yards) and hazardous waste (208 cubic yards).
- Operation for an estimated 30-years non-hazardous waste (1,000 to 2,000 cubic yards) and hazardous waste (1,658 cubic yards).

These volumes of non-hazardous and hazardous waste do not differ significantly from that of the original BSPP, except however, no HTF would be used and no HTF related wastes would be generated.

Non-hazardous waste would be stored on site in appropriate containers and recycled or disposed of in a Class III landfill on a regular basis. As shown in **Waste Management Table 2**, there are six Class III waste disposal facilities in Riverside County that could potentially accommodate the Modified BSPP non-hazardous construction and operation wastes project: Badlands, Blythe, Desert Center, Lamb Canyon, Mecca II, and Oasis (CalRecycle, 2013).

Waste Management Table 2
Riverside County Landfill Capacity

Landfill	Permitted Days of Operation	Remaining Capacity (cubic yards)
Badlands	Mon - Sat, closed holidays	14,730,025
Blythe	Mon - Fri and first Sat of the month, closed holidays	4,159,388
Desert Center	2 days per year, closed holidays	23,246
Lamb Canyon	Mon - Sat, closed holidays	18,955,000
Mecca II	2 days per year, closed holidays	34,786
Oasis	Every Weds and Sat, closed holidays	149,597
	Total	**38,052,042**

Sources: CalRecycle, 2013; RCoWMD, 2013.

The combined remaining capacity of these six landfills is approximately 38 million cubic yards (CalRecycle, 2013). The non-recyclable, non-reusable component of the Modified BSPP waste stream would contribute to filling the available capacity of these landfills and would contribute a substantial portion of the remaining capacity at the Desert Center and Mecca II landfills. The remaining capacity of Desert Center and Mecca II landfills is limited to 34,786 cubic yards and 23,246 cubic yards, respectively (CalRecycle, 2013). In addition, the days of operation of these two landfills is very limited (RCoWMD, 2013). Therefore, existing 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 and Mecca II. Disposal of the non-hazardous solid wastes generated by the proposed modified project could occur without impacting the capacity or remaining life of the other Class III facilities.

There are two Class I waste disposal facilities in California that are currently accepting hazardous waste: Clean Harbors Buttonwillow Landfill in Kern County and the Chemical Waste Management Kettleman Hills Landfill in Kings County (PVSI, 2009a). 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 remaining operating years (PVSI, 2009a). 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 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 noted above, the type and quantity of waste for non-operation and closure have not been identified. The repair/restoration plan and facility closure plan prepared pursuant to conditions of certification **COMPLIANCE-14** and **15** would provide this information as well as disposal facilities with adequate capacity to receive the wastes.

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).

As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the Modified BSPP would add to the total quantity of waste generated in the Riverside County. Project non-hazardous wastes would be generated in modest quantities, approximately 2,132 cubic yards of solid waste during construction and 34 to 67 cubic yards per year during operation. These wastes would be recycled wherever practical and sufficient capacity is available at several treatment and disposal facilities to handle the volumes of wastes that would be generated by the project. The four available Class III landfills listed in **Waste Management Table 2** have a remaining capacity of approximately 38 million cubic yards.

Approximately 52 cubic yards of construction hazardous waste and 55 cubic yards per year of operation hazardous waste would be generated by the Modified BSPP. California Class I landfills have over 15 million cubic yards of remaining capacity for hazardous waste. There is sufficient landfill capacity for hazardous waste in Riverside County.

The amount of non-hazardous and hazardous wastes generated during construction, operation, and closure of the Modified BSPP would add to the total quantity of hazardous and non-hazardous waste generated in Riverside County. Projects in Riverside County would recycle waste wherever practical and sufficient landfill capacity is available throughout the area, especially with the addition of the Mesquite Regional Landfill with a capacity of 600 million tons when it is fully constructed (Fisher, 2013). As part of the County of Riverside AB 939 planning and reporting requirements, the county estimates that the existing county waste disposal system provides approximately 59.3 million tons of permitted disposal capacity (as of 12/31/2006), which would provide more than 15 years of the county's disposal capacity (RCoWMD, 2009). Therefore, impacts of the Modified BSPP, when combined with impacts of other development projects currently proposed within Riverside County, would not result in significant adverse cumulative impacts under CEQA. Staff concludes that the waste generated by the Modified BSPP would not cumulatively result in local or regional significant adverse waste management impacts, under CEQA, provided that applicant complies with **WASTE-10** and diverts project wastes to Riverside County landfills with adequate capacity.

LORS COMPLIANCE

Energy Commission staff concludes that the proposed modified project would comply with all applicable LORS regulating the management of non-hazardous and hazardous wastes during facility construction and operation. The project owner would be required to recycle and/or dispose of non-hazardous and hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during project construction and operation, the Modified BSPP would be required to obtain a hazardous waste generator identification number from U.S. EPA. The Modified BSPP 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.

NOTEWORTHY PUBLIC BENEFITS

Staff has not identified any noteworthy public benefits associated with waste management.

RESPONSE TO COMMENTS

Only two comments were submitted, both by Mr. Daniel Rivest.

Comments: On August 7, 2012, Mr. Rivest commented that PV modules made out of silicon are more preferable than PV modules made using CdTe (DR, 2012a). The reasoning stated was: (a) production cost of silicon PV modules has decreased making the costs of these modules comparable to the cost of CdTe modules; (b) CdTe modules need to be disposed of as hazardous waste, whereas silicon modules can be disposed of as a non-hazardous waste; (c) silicon modules produce more power and have a longer life expectancy than do CdTe modules; and (d) the recycle cost of silicon modules is less. On September 25, 2012, Mr. Rivest provided comments on an article he submitted on September 24, 2012 (DR, 2012b, DR, 2012c). Mr. Rivest's comments were again directed towards cost and recycling. In both comment submittals, Mr. Rivest indicated that the Energy Commission would purchase material or otherwise be responsible for development of the proposed project.

Staff Response: The Energy Commission is not building this project nor buying PV modules. The Energy Commission is the state licensing authority for this project, solely. All cost and liability related to this project are the responsibility of the project owner, and the decision to assume additional cost or additional liability is the responsibility of the project owner. The analysis presented in this FSA is based on the project as proposed by the project owner.

The project owner may use either CdTe or silicon PV modules. Staff has analyzed the potential impacts related to both kinds of PV modules. If CdTe modules were used, then as discussed above, proposed DTSC regulations would require the modules be recycled (DTSC, 2013). If the DTSC regulations are not finalized, then the project owner would have to test the CdTe material before disposal at a Class III or Class I landfill. If silicon modules were selected, then damaged or broken silicon modules would have to be recycled or disposed of at a Class III landfill. There would be no significant adverse impacts to waste management using either type of PV module for the proposed project.

CONCLUSIONS

Staff concludes that:

- In areas that may contain UXO, pre-construction UXO surveys with qualified technicians that meet Department of Defense requirements and/or employ UXO experts before and during ground disturbances are required.
- In the unlikely event that contaminated soil is encountered during construction activities, a Professional Engineer or Professional Geologist would inspect the site, determine what is required to characterize the nature and extent of contamination, and provide a report to the CPM and DTSC with findings and recommended actions. The recommended action could include excavation of the contaminated soil. Excavated sol would be segregated, sampled, and tested to determine appropriate disposal and treatment options.
- The Modified BSPP wastes would be managed in compliance with all applicable waste management LORS.
- Construction, operation, and closure wastes would be characterized and managed as either universal, non-hazardous, or hazardous waste.
- All universal waste would be recycled to the extent practicable;
- All non-hazardous wastes would be recycled or reused. Non-hazardous waste that cannot be recycled 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.

Based on estimates provided by the project owner, disposal of non-hazardous Modified BSPP wastes would be approximately the same as the original project and would not adversely impact Class III landfill capacity and disposal of project-related hazardous wastes would not adversely impact Class I landfill capacity.

Existing conditions of certification **WASTE-1** through **-7**, **-9** and **-10** would ensure that the Modified BSPP would remain in compliance and no new conditions of certification are proposed. These conditions would require the project owner to:

- Ensure the project site is investigated and remediated for any UXO that may pose a risk to construction personnel or the environment and train project personnel in safety procedures (**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**);
- 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**).

Because the proposed amended project would employ the PV technology, which would eliminate parabolic trough technology and the need for HTF, staff is recommending the deletion of Waste Discharge Requirement stipulations for treatment of HTF-contaminated soils (**WASTE-8**).

PROPOSED CONDITIONS OF CERTIFICATION

Staff has proposed modifications to the **Waste Management** conditions of certification as shown below. (**Note:** Deleted text is in ~~strikethrough~~; new text is **bold and underlined**)

WASTE-1 The project owner shall prepare a **unexploded ordnance (**UXO**)** Identification, Training and Reporting Plan to properly **evaluate the site for presence of UXO and** 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 ~~C~~**c**ompliance ~~P~~**p**roject ~~M~~**m**anager (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;
- Identification of available trained experts who will oversee earth-moving activities where ordnance could be uncovered and respond to notification of discovery of any ordnance (unexploded or not); and
- Work plan to identify, recover, and remove discovered ordnance, and to complete additional field screening, 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 later than 30 days prior to the start of site mobilization. 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: No later than 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;
- a reuse/recycling plan for construction and demolition materials that meets or exceeds the 50 percent waste diversion goal established by the Integrated Waste Management Compliance Act; 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 later 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 (USEPA) 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 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 contacts with the local Certified Unified Program Agency and the ~~Department of Toxic Substances Control~~ **DTSC** 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 later 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 Heat Transfer Fluid (HTF) as described in Condition **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 Decision. Cleanup and temporary staging of HTF-contaminated soils shall be conducted in accordance with the approved Operation Waste Management Plan required in Condition **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 the Department of Toxic Substances Control (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 Section 25203 and procedures outlined in the approved Operation Waste Management Plan required in Condition **WASTE-7** and reported to the CPM in accordance with Condition **WASTE-9**.~~

~~If DTSC and the CPM determine the HTF-contaminated soil is considered non-hazardous it shall be retained in the land treatment unit (LTU) and treated on-site in accordance with the Waste Discharge Requirements contained in the **Soil and Water Resources** section of this Decision.~~

~~**Verification:** The project owner shall submit to the CPM and the DTSC for approval the project owner's assessment of whether the HTF contaminated soil is considered hazardous or non-hazardous under state regulations. HTF-contaminated soil that exceeds the regulatory hazardous waste levels must be disposed of in accordance with California Health and Safety Code Section 25203. HTF-contaminated soil that does not exceed the hazardous waste levels may be discharged to the on-site 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 Decision.~~

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 LORS and requirements. For the purpose of this condition of certification, "release" shall have the definition in Title 40 of the Code of Federal Regulations, Part 302.3.

Verification: No later than 30 days of the date that a project-related hazardous substance release was discovered, the project manager shall provide a copy of the accidental spill or unauthorized release documentation to the CPM.

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.

WASTE-10 The project owner shall ensure that none of the project's non-hazardous, non-recyclable, and non-reusable construction and operation wastes shall be diverted to or deposited at either the Desert Center Landfill or the Oasis Sanitary Landfill.

Verification: The project owner shall provide documentation of all project-related solid waste disposal activities and identify the landfills receiving project-related wastes in the annual compliance report submitted to the CPM.

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WORKER SAFETY AND FIRE PROTECTION

Testimony of Alvin Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

The California Energy Commission staff (staff) has reviewed the Revised Petition to Amend filed April 12, 2013 (NEBSEC2013a) to modify the Blythe Solar Power Project (BSPP), approved by the California Energy Commission (Energy Commission) in 2010 (CEC 2010d). Staff concludes that if the project owner provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program for the modified project, as required by the existing and partially revised Conditions of Certification **WORKER SAFETY-1**and **-2** and fulfils the requirements of the existing or newly proposed Conditions of Certification **WORKER SAFETY-3** through **-10**, the modified project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards (LORS). The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed 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 LORS.

Staff has considered all relevant information as well as past experience at other solar photovoltaic power plants in California and elsewhere and has determined that the modified project would cause a significant direct impact on local fire protection services, but not cause a significant cumulative impact. A direct impact is caused by the need to equip and train the fire department to respond to the specific unique hazards posed by solar Photovoltaic (PV) technology which although not new to the county, poses certain unique safety hazards that would pose a risk to emergency responders. No significant cumulative impact would occur because the construction and operation of this solar PV plant is not likely to change the overall hazard profile of facilities requiring emergency response in the county, emergency events at this solar PV plant are not likely to escalate within or beyond the power plant site, and emergencies are not likely to occur simultaneously with other facilities. Therefore, staff is proposing mitigation to reduce these impacts to less than significant by requiring payment to the Riverside County Fire Department (RCFD) for capital and operations and maintenance support (see proposed Conditions of Certification **WORKER SAFETY-7**).

INTRODUCTION

The proposed action evaluated within this Staff Assessment (SA) is the construction and operation of the modified BSPP, a proposed solar PV electricity generation facility located in Riverside County, California on public lands administered by the Bureau of Land Management (BLM).

Worker safety and fire protection is regulated through 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 SA is to assess the worker safety and fire protection measures proposed for the modified BSPP and to determine whether the project owner would have 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.

METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Two issues are assessed in Worker Safety-Fire Protection:

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities; and
2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by California Occupational Safety and Health Administration (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 project owner 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 project owner 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 project owner 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 an applicant or project owner 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 edition 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 787.6	Adopts the 2010 edition of the California Fire Code and portions of the 2010 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 Dept. of Environmental Health, Hazardous Materials Releases	Adopts State requirements and guidelines to govern hazardous materials release response plans and inventories.

PROPOSED MODIFIED PROJECT

The modifications proposed in the April 2013 revised petition to amend would replace the solar thermal technology entirely with PV generating technology, reduce the physical size of the BSPP, and reduce the amount of generated electricity. The modified project would be located entirely on publicly-owned land managed by BLM, a total of 4,070 acres, excluding off-site linear facilities, which is approximately 3,000 acres less than the original approved 7,043 acres (**Project Description Figure 1**). Linears to and from the site -- other than the natural gas pipeline which has been eliminated -- would be the same as for the original approved project, and the BSPP would continue to interconnect to the regional transmission grid via the same gen-tie line to Southern California Edison's Colorado River Substation, which is currently under construction.

NextEra Blythe Solar proposes to develop the BSPP in four phases designed to generate a total of approximately 485 MW (nominal) of electricity when completed (**Project Description Figure 2**). NextEra Blythe Solar has not selected the specific PV modules nor has it decided on whether a tracker system, fixed tilt system, or combination of the two systems would be installed. NextEra Blythe Solar is requesting the Decision be amended to allow the specific combination of PV technologies to be selected prior to construction without the need for filing another amendment. The four proposed units would share the operations and maintenance facility, one on-site switchyard, access and maintenance roads, perimeter fencing and other ancillary security facilities, and a 230-kV gen-tie line.

SETTING AND EXISTING CONDITIONS

Fire support services to the site would be under the jurisdiction of the Riverside County Fire Department (RCFD). The closest station to the project site would be Blythe Air Base Station #45, located at 17280 W. Hobson Way, approximately three miles from the BSPP site. Response time from this station would be 2-3 minutes once dispatched. The next closest stations would be Ripley Station #44, located at 13987 Main Street, about 12 miles away, with a response time of 11-12 minutes after dispatch. RCFD fire stations are staffed full-time with a minimum of three personnel per shift which include paramedics (RCFD 2010a).

Worker Safety and Fire Protection Table 2
Fire and Emergency Response for the BSPP*

RCFD Station	Response Time**	Distance to BSPP	EMS/HazMat Capability***
Blythe Air Base Station #45	2-3 minutes	~3 mile	Y/Y
Ripley Station #44	11-12 minutes	~12 miles	Y/Y

*Source: E-mail communications with the RCFD (RCFD 2010a)
**Response times are estimated from the moment of dispatch.
***All personnel are trained to EMT-1 level and first responder for hazardous materials incidents.

The project owner 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 an incident involving the small amounts of 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 BSPP. The RCFD hazmat unit is located in Palm Desert (about 100 miles away) and would respond within 1.5-2 hours (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 & Appendix I). To address the unlikely possibility that soil contamination would be encountered during construction of the BSPP, 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. 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 near the California-Arizona border between 1942 and 1945 and in 1964. The project owner stated that a geophysical survey by qualified UXO personnel would be conducted in order to clear potential UXOs before beginning project construction. The project owner also stated that site personnel would be trained to identify and respond to UXOs if discovered (Solar Millennium 2009a, Section 5.18.2). In response to Data Requests 254-258, 259 and 260, from the original proceeding, UXO detection and removal would be carried out in specific areas of concern and would include Digital Geophysical Mapping, Analog Geophysical Mapping, intrusive investigations, disposal of any discovered Munitions and Explosives of Concern (MEC), and detailed record keeping and reporting of all findings. Qualified UXO technicians would recover and destroy any MEC found according to all applicable LORS and safety guidelines (AECOM2010a). These Geophysical Survey Results were completed in 2010 (for

Phase 1A) and 2011 (for Phase 1b). Both reports of these surveys were reviewed by staff and approved. The MEC/UXO Plan was also approved.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

WORKER SAFETY

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed BSPP would be exposed to loud noises, moving equipment, trenches, and heat stress 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 modified BSPP 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 project owner 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 modified BSPP would be exposed to hazards typical of construction and operation of any solar electric power generating facility except for certain specific hazards as described below. Workers would be involved with site grading, construction of buildings, installation of PV panels, and construction of power blocks all occurring in a very hot desert environment. Even with the modified BSPP, small amounts of hazardous materials (e.g., paint, solvents, gasoline, diesel fuel, motor oil, lubricants, and welding gases) would be used and would be similar to the originally-approved project that used parabolic trough technology. The only difference in hazards posed to workers would be lack of confined space or elevated work stations and risks posed by larger amount of hazardous materials.

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) and Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) 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
- 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 the modified BSPP, detailed programs and plans would be provided to the California Energy Commission Compliance Project Manager (CPM) and to the RCFD pursuant to the existing and partially revised Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at BSPP, 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) and Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) would be applicable to the project. Written safety programs for the modified BSPP, which the project owner 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 the modified BSPP, all detailed programs and plans would be provided to the CPM and RCFD pursuant to existing and partially revised Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the project owner has 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 project owner submit a final Fire Prevention Plan to the CPM for review and approval and to the RCFD for review and comment to satisfy the existing requirement found in Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**. In addition, staff feels that joint training exercises with the RCFD in fire suppression, rescue, hazmat spill response, and EMS response is no longer necessary with a PV solar power plant because of the lowered hazards and thus staff proposes that existing Condition of Certification **WORKER SAFETY-9** be deleted.

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 BSPP 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 PV panels that generate electricity when exposed to sunlight. These panels must be maintained and cleaned and the area under the PV panels must be kept free from weeds. Herbicides would be applied as necessary. Exposure to workers via inhalation and ingestion of dusts containing herbicides poses a health risk. 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.

Solar photovoltaic panels also present a unique safety hazard in that individual PV panels will continue to be energized and generating electricity even when disconnected or covered unless the covering is composed of 100 percent light-blocking material (Underwriters Laboratories Inc. 2011; California Department of Forestry and Fire Protection (“CalFire”) 2008 and 2010; Orange County Fire Chiefs Association 2010). Even when disconnected from the grid and on a cloudy day, they remain energized. It is also estimated that at night, the light from a fire department light trucks or even the fire itself is powerful enough to re-energize a PV panel to a level that presents a shock hazard. Therefore, even after disconnecting from the grid, PV panels are capable of discharging current to an object or a person. Standard OSHA regulations requiring “Lockout/Tagout” of electrical systems are not sufficient to eliminate the threat posed by a PV panel or multiple panels to on-site workers. Besides presenting a threat to workers, emergency response personal engaged in rescue or fire suppression are also at risk of coming into contact with electrified PV panels. Even though statistical data involving accidental electrocution of fire fighters by PV solar power systems is not readily available to provide quantifiable data analysis of these systems, anecdotal evidence exists that as many as 215 fire fighters per year sustained injuries due to electric shock out of a total of 40,270 fire fighters injured during fire suppression operations in the United States annually from 2003 through 2006 (Fire Protection Research Foundation 2010).

The Revised Petition to Amend (NEBSEC2013a) has indicated that workers will be adequately trained and protected and has included precautions against heat stress, exposure to herbicides, and Best Management Practices (BMPs) that would be implemented to protect workers and emergency responders from electrical shock hazards when a fire or other event involves solar panels. Existing partially revised Conditions of Certification **WORKER SAFETY-1** and **2** would ensure that these programs are implemented. 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.
- Safety measures, including engineering controls and administrative controls (Best Management Practices) that will be implemented to protect workers and emergency responders when a fire or other event that necessitates a response occurs that involves solar panels.

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. Because heat illness incidences (including but not limited to heat stress, heat exhaustion, heat stroke, or heat prostration) are not only highly probable in desert environments but have now occurred at desert solar power plants under construction, staff believes it is imperative to keep track of these incidences to ensure that all worker protections are indeed being implemented and are adequate. Therefore, staff proposes new Condition **WORKER SAFETY-11** which would require the project owner to immediately report all heat-related incidences (regardless of whether they are reportable under OSHA regulations) to the CPM within 24 hours of occurrence. In this manner, staff can have a current data base of occurrences at all desert power plants to assist in determining the adequacy of worker protection.

A BMP requiring proper herbicide storage and application would 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. EPA (EPA 1993), or more recent guidelines established by the State of California or U.S. EPA. Another BMP to address safety hazards presented by electrified solar panels will also reduce risks to workers and emergency responders.

Another worker safety issue has surfaced based upon experience at the Ivanpah and Genesis solar power plants. During the summer months in what is referred to as the "monsoon season", sub-tropical weather fronts enter the desert southwest from the south and bring intense storms with extremely heavy rainfall over very brief periods of time. These storms are mostly unpredictable and flash floods can result from the dropping of high amounts of water (inches of rain) in a very short time onto the desert floor resulting in high levels of run-off in otherwise dry washes. The force of moving water in a flash flood is often underestimated and workers at a desert solar power plant site may attempt to drive or walk through the swift flows to cross it. However, as little as two feet of water is enough to carry away most passenger vehicles and swiftly moving water six inches deep can cause a person to lose balance (NOAA 2005). Although the operation and maintenance building would be located outside of the large desert washes, the paved main access road and several other internal unpaved roads would be placed within washes that are expected to flood during heavy storms. To avoid injury or death during a flood event, staff proposes to modify Conditions **WORKER SAFETY-1** and **WORKER SAFETY-2** to include a Construction Flood Safety Plan and an Operations Flood Safety Plan. These Plans would provide requirements and guidance to on-site workers with respect to avoiding injury or death during a very large flood event (100-year flooding or larger). The Plans would be submitted to the Energy Commission for review and approval and include the following:

- Specific actions to be completed during a very large flood event in order to protect workers.
- Identified flood refuge areas that would not be susceptible to 100-year flooding.
- Requirements that all on-site workers implement the Plan and that the Plan be updated, as needed, during the life of the project.

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 seven million persons work in the construction industry, representing 6 percent of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90 percent 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 percent) between 1980 and 1993.
- Construction injuries account for 15 percent 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, existing Condition of Certification **WORKER SAFETY-3** would require the 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.

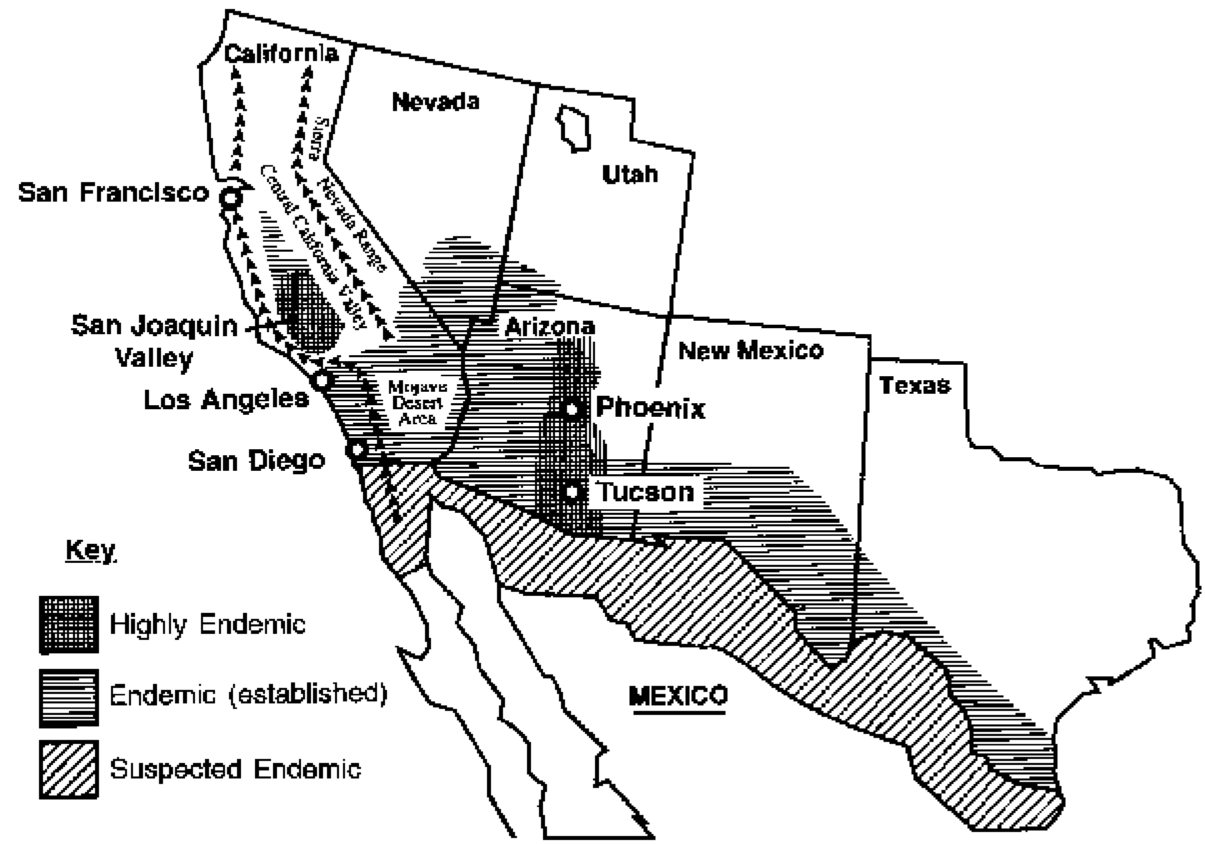
In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in existing 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 (see **Worker Safety and Fire Protection Figures 1** and **2**). 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 VF. 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.

In October 2007, a construction crew excavated a trench for a new water pipe in California. Within three weeks, 10 of 12 crew members developed Valley Fever) with 7 of the 10 displaying abnormal chest x-rays, four had rashes, and one had an infection that had spread beyond his lungs and affected his skin (Das, Rupali et al. 2012). Over the next few months, the ten ill crew members missed at least 1660 hours of work and two workers were on disability for at least five months. A February 2013 outbreak of VF affecting at least 28 workers at a photovoltaic solar plant in eastern San Luis Obispo County, along with an increase in inmates at two San Joaquin Valley prisons coming down with the disease, has sparked renewed interest and concern. (The California Department of Public Health, Cal-OSHA, and San Luis Obispo County are investigating that outbreak.) The interest is high enough for the California State Senate to declaring the month of August 2013 as Valley Fever Awareness Month. This designation appears justified in that although California does not yet have an official statewide method of tracking the rate of Valley Fever infections, infection rates in California and Arizona have risen 400 percent in the last 10-year reporting period, from an estimated 31 cases for every 100,000 people in 1999 to 157 cases for every 100,000 people in 2011 and the number of cases in Kern County alone has more than tripled from 2009 to a total of 2,051 cases in 2010 and 2,734 cases in 2011 (MMWR 2013).

Worker Safety and Fire Protection Figure 1
Geographic Distribution of Coccidioidomycosis*

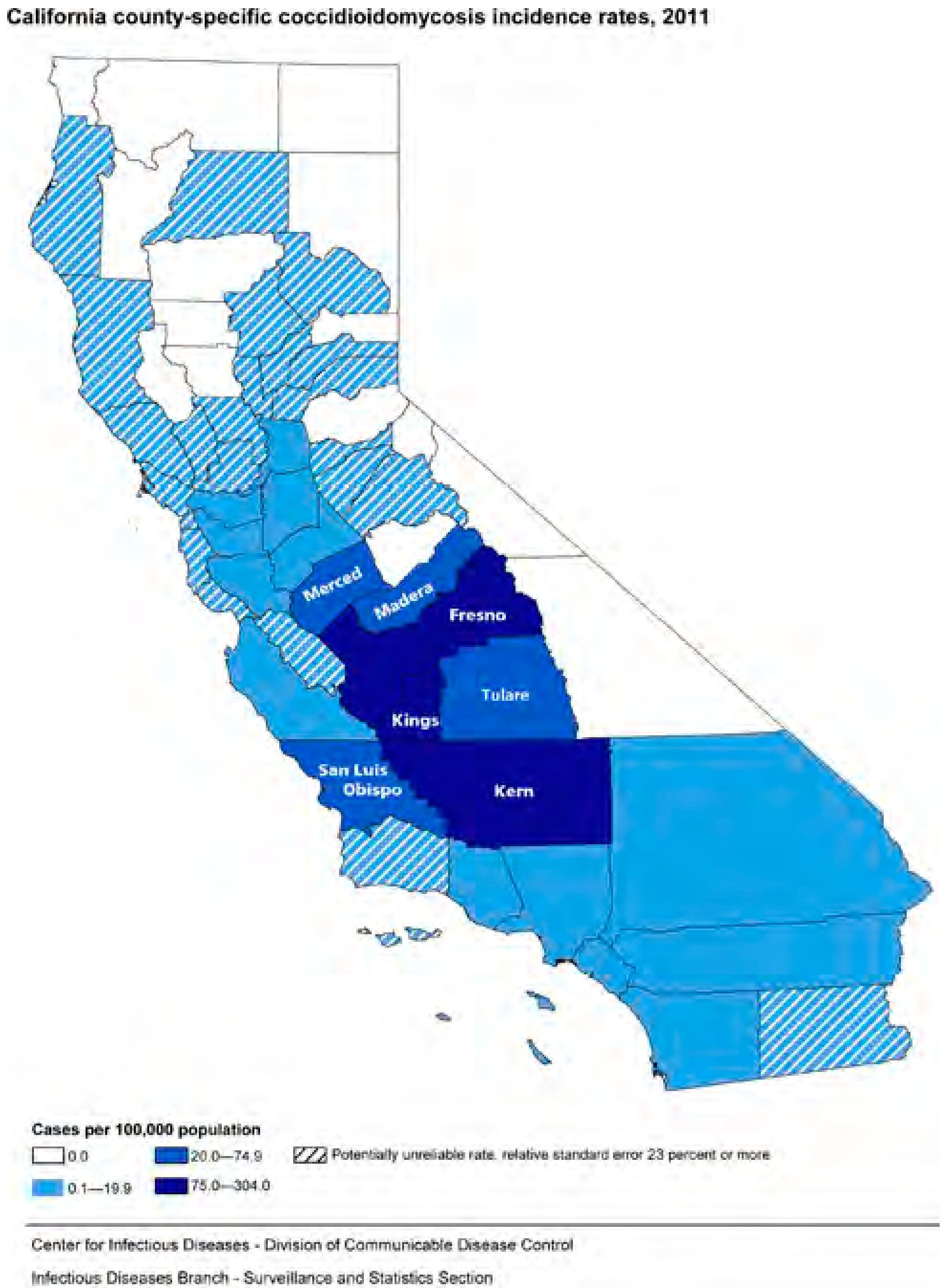


*Source: CDC 2006, Figure 2

The Centers for Disease Control and Prevention also reports that the total number of VF cases nationwide rose by nearly 900 percent from 1998 to 2011 (MMWR 2013). Researchers don't have a good explanation for the dramatic increase even when accounting for growing populations throughout the Southwest, although when soil is dry and it is windy, more spores are likely to become airborne in endemic areas, according to Dr. Gil Chavez, Deputy Director of the Center for Infectious Diseases at the California Department of Public Health.

A recent report from the U.S. Centers for Disease Control (CDC 2012, MMWR 2013) showed that the rise in VF incidence has resulted in it being a major cause of community-acquired pneumonia in California and the southwestern U.S. The CDC found that in 2011, more than 20,000 cases were reported in the U.S., twice as many cases as tuberculosis. Nearly 75 percent of people who get VF miss work or school due to their illness, and more than 40 percent of people who get VF need to be hospitalized.

Worker Safety and Fire Protection Figure 2
Geographic Distribution of Coccidioidomycosis in California



Source: Valley Fever Fact Sheet, California Dept. of Public Health. June 2013

In Ventura County after the Northridge earthquake of 1994, 203 cases including 3 deaths occurred with most of the cases occurring in the town of Simi Valley. In 2001, at least 7 people attending the World Championship of Model Airplane Flying in Lost Hills in Kern County developed VF after attending this event for only a few days. And at the Taft Correctional Facility in Kern County, 88 cases were identified from 2003-04. In

2011 (last full year of data), 5697 cases in California were reported to public health officials.

A 2004 CDC report attributed increases in California and Arizona prior to 2004 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, Kern County experienced the highest incidence rates (150 cases per 100,000 population), and non-Hispanic blacks having the highest hospitalization rates (7.5 per 100,000 population).

Public health officials have tried to explain the sudden increase in Coccidioidomycosis cases that began in the early 1990's. They 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 percent of outbreaks). One 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).

In 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).

VF 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) (see **Worker Safety and Fire Protection Table 3,** Disease Forms of Valley Fever).

Worker Safety and Fire Protection Table 3
Disease Forms of Valley Fever

Categories	Notes
Asymptomatic	• Occurs in about 50 percent 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 and the recent outbreaks in California, it is clear that the potential for Valley Fever to impact workers during construction and operation of the proposed modified BSPP is very high. To minimize this 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 Valley Fever to less than significant. Towards that, existing partially revised Condition of Certification **WORKER SAFETY-8** would require that the dust control measures found in proposed Conditions of Certification **AQ-SC3** and **AQ-SC4** be supplemented with additional requirements including implementing additional monitoring methods.

And because VF incidences are not only probable in desert environments but have now occurred at a solar PV power plant under construction in another very arid part of the state (and not under the licensing authority of the Energy Commission),,staff believes it is imperative to keep track of these incidences to ensure that all worker protections are indeed being implemented and are adequate. Therefore, staff proposes new Condition **WORKER SAFETY-10** which would require the project owner to immediately report all verified incidences of Valley Fever in all workers at the site to the CPM within 24 hours of receiving notification from a medical professional that the worker does indeed have Valley Fever. In this manner, staff can have an up-to-date data base of occurrences at all desert power plants to assist in determining the adequacy of worker protection.

Fire Hazards

During construction and operation of the proposed modified BSPP 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 with automatic fire detection and suppression systems are unlikely to develop at power plants.

Staff reviewed the information provided in the AFC and in the Revised Petition to Amend (NEBSEC2013a) 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 modified BSPP 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 2.5.7).

Operation

The information in the AFC and in the Revised Petition to Amend (NEBSEC2013a) indicate that the project intends to meet the fire protection and suppression requirements of the 2010 California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements.

The proposed modified BSPP would have two access gates that can be reached from one access road, that being a new public road from I-10. Staff finds that a second gate is necessary to ensure fire department access for emergency response, but that given the greatly reduced need for emergency access a PV power plant presents as compared to a thermal solar facility that utilizes a very large amount of heat transfer fluid that is highly combustible (and flammable at elevated operating temperatures and pressures), a second road to the facility is not needed. Therefore, staff proposes a second access gate, but not a second road, to the site. This secondary gate would be equipped with either a remote system or a keypad for fire department personnel to open the gate. The precise location of this second access road would be determined after taking into consideration environmental and engineering concerns.

Fire suppression elements in the proposed O & M building would include both fixed and portable fire extinguishing systems. The fire water would be supplied from an on-site well and stored in one 20,000 gallon raw water tank (page 2-18 of the Revised Petition to Amend, NEBSEC 2013a). One electric and one diesel-fueled backup firewater pump would ensure water supply and an electric jockey pump would maintain pressure in the system (Solar Millennium 2009a, Section 5.18.3.2).

A sprinkler system would be installed in the O & M buildings. In addition to the fixed fire protection system, appropriate class of service portable extinguishers would be located at the O & M building at code-approved intervals.

The project owner would be required by existing partially revised Conditions of Certification **WORKER SAFETY-1** and **-2** to provide the final construction and operations Fire Protection and Prevention Programs to staff and to the RCFD prior to construction and operation of the project to confirm the adequacy of the proposed fire protection measures.

Riverside County does not have a “county” fire department per se and instead the county contracts with Cal Fire, which is a state agency under the California Department of Forestry and Fire Protection that also includes the Office of the California Fire Marshall. The RCFD, however, does speak for Riverside County and in a May 20, 2010 e-mail, Captain Newman of the RCFD stated that the RCFD does not have an “auto aid agreement” with the nearby City of Blythe Fire Department or the Chuckawalla Valley State Prison fire department and that the prison fire department cannot be relied upon as a primary responder in any event. The RCFD is the Authority Having Jurisdiction to the BSPP and will provide the initial response. The RCFD reiterated in 2013 that it does not have a mutual aid agreement with any other fire department in the county.

Staff has considered all relevant information as well as reports available on the anticipated need for emergency response at existing PV solar power plants that are similar to the proposed modified BSPP. The proposed facility would be located in an area that is currently served by the RCFD.

Staff finds that the RCFD will have to provide some level of services and encumber some time and funds in six areas:

1. Becoming familiar with and planning for emergency responses to this new PV power plant.
2. Fire protection plan reviews, inspections.
3. Fire response.
4. Hazmat spill response involving chemicals at the water treatment facility.
5. Rescue including rescue from energized solar panels.
6. Emergency Medical Services (EMS).

The safety and fire literature addressing emergency response at PV solar power plants is just now evolving but it appears that although risks are low, emergency response is still necessary. The proposed modified BSPP is very similar to the PV solar power plants currently operating in the Riverside County desert region and thus the RCFD would be able to respond to fire, hazmat, rescue, and EMS emergencies in a timely manner. Staff has determined that the direct and cumulative impacts to the RCFD would be low and thus staff recommends that the mitigation should be low.

Under ordinary circumstances where a portion of property taxes paid by an industrial development would go to the local fire department to off-set incremental direct and cumulative impacts, staff would not recommend that a project owner pay additional fees to mitigate impacts. However, in this case, the modified BSPP is exempt from paying the usual and customary property taxes and is furthermore exempt from the Riverside County “sun tax” applied to solar power plants located on county land (the modified BSPP will be located entirely on BLM land). Therefore, in order to mitigate the direct impact to the RCFD, staff is recommending adoption of revised condition **WORKER SAFETY-7**. Staff is recommending that both the initial one-time payment and the first annual payment be made no later than 30 days prior to the start of site mobilization because the fire department needs as much lead time as possible to procure equipment, adjust staffing needs, become familiar with the exact layout of the project, and conduct training.

The Energy Commission Decision for the Blythe project (CEC 2010d) requires the BSPP to pay as mitigation $850,000 initially for capital improvements and $375,000 annually for Operations and Maintenance. Staff believes that this amount should be adjusted down to reflect the lower impacts posed by the modified PV project. To aid staff in making an adjustment, staff developed a revised Emergency Response Matrix that staff, fire departments, and project owners may use to assess the level of emergency response need (CEC 2013; see Worker Safety/Fire Protection Appendix A). 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 a useful tool but cautions against using it as the <u>sole</u> basis for determining need and for allocating financial responsibility for direct individual or cumulative impacts. Additionally, if a project owner chooses to not rely on staff’s analysis, staff recommends that the project owner prepare an independent fire needs assessment and a fire risk assessment for the modified BSPP to provide its own assessment of impacts on emergency response services and subsequent mitigation.

Staff’s analysis and determination of mitigation is based upon the following:

1. A revised Staff Emergency Response Matrix;
2. A literature (data base) review of incidences at PV power plants;
3. The need for and difficulty of rescue if a worker is caught on a PV panel;
4. The need for the RCFD to expend resources to become familiar with this particular power plant;
5. The decreased fire risk and hazardous materials spill response due to the removal of HTF from the project; and
6. Staff’s expertise and judgment.

Although the modified project will undoubtedly lower the risks of certain impacts, other risks such as the difficultly in fire suppression and rescue from a still-energized PV panel would be raised. The original BSPP project is required to pay to the RCFD as mitigation of both direct and cumulative impacts a total of $12,100,000 over a 30-year project lifespan ($850,000 initially for capital improvements and $375,000 annually for operations and maintenance). This amount was determined by staff when considering the impacts of the three solar projects proposed for the I-10 corridor within Riverside County that included the Genesis and Palen solar projects. Staff believes that when considering all the information available and then taking the ratio of the new scores obtained for the modified BSPP (1.15) and the present Genesis project (2.8) when utilizing the revised Emergency Response Matrix and applying that ratio (0.41) to the $12,100,000 required by the Commission Decision, the result is a reduction to ~$4,961,000 over thirty years. However, such a simple ratio-reduction does not, in staff's opinion, take into account all of the six factors listed above. Staff believes that reducing the amount of mitigation by an additional factor of 35 percent would result in a 30-year payment for mitigation of ~$3.25M and that would be the proper revised amount as mitigation to be paid by the modified BSPP.

Therefore, staff proposes a modified Condition of Certification **WORKER SAFETY- 7** for the modified BSPP to fund fire department capital improvements in the amount of $250,000 and to make an annual payment of $100,000 to mitigate its individual impact on the fire department.
.
Also, because of recent problems at other solar and gas-fired power plants where questions about fire department plan review have been raised, staff believes that it is necessary to clearly define the duty of the project owner to work with the local fire department in the engineering review of fire detection and suppression systems. Staff therefore recommends adoption of new re-numbered condition **WORKER SAFETY-9** which would require the project owner to submit to the RCFD all plans and schematic diagrams that show the details of all fire detection and suppression systems and pay the RCFD its usual and customary fee for the review of those plans and then later to inspect the facility to ensure compliance with those plans. The project owner would then be required to provide proof to the CPM that the plans have been submitted to the RCFD on a timely basis, a copy of the comments received from the RCFD, and proof that the usual and customary payments for plan review and facility inspections have been made to the fire department.

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 on site in order to treat cardiac arrhythmias resulting from industrial accidents or other non-work related causes.

Existing Condition of Certification **WORKER SAFETY-5,** 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 operations also be trained in its use.

PROJECT CLOSURE AND NON-OPERATION AND FACILITY CLOSURE

Closure of the proposed BSPP (temporary or permanent) would follow a facility closure plan prepared by the project owner and designed to minimize public health and environmental impacts. Non-operation and facility closure procedures would be consistent with all applicable LORS (Solar Millennium 2009a, Section 5.6.3.4). Staff expects that impacts from the closure and non-operation and facility closure process would represent a fraction of the impacts associated with the construction or operation of the proposed BSPP. Therefore based on staff's analysis for the construction and operation phases of this project, staff concludes that hazardous materials-related impacts from closure and non-operation and facility closure of the BSPP would be insignificant.

Non-operation and facility closure

The non-operation and facility closure of the modified BSPP is not expected to result in adverse impacts related to Worker Safety/Fire Protection. It is unlikely that the construction or non-operation and facility closure of any of the cumulative projects would occur concurrently with the non-operation and facility closure of this project, because the non-operation and facility closure is not expected to occur for approximately 30 years. As a result, it is not expected that significant impacts related to Worker Safety/Fire Protection during non-operation and facility closure of the modified BSPP generated by the cumulative projects will occur.

CUMULATIVE IMPACTS

The **Executive Summary** provides detailed information on the potential cumulative solar and other development projects in the project area (see also Figure 1 in the ES). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed modified project. In summary, these projects are placed into three categories:

- Past and present “existing” projects on BLM, State, and private lands: Nine “existing” projects are identified in the **Executive Summary**.
- “Pending” energy projects in the immediate area and in the desert region: Eleven “pending” projects are identified in the **Executive Summary**.
- “Foreseeable” projects on BLM, State, and private lands: Thirty-four “foreseeable” projects are identified in the **Executive Summary**.

All of the above projects are defined within a geographic area that has been identified by the Energy Commission 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 the California Environmental Quality Act (CEQA). Even if the cumulative projects listed in the **Executive Summary** tables have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this section.

EFFECTS OF PAST AND PRESENT PROJECTS

For this analysis, staff notes that all of these projects or developments in the area or region have or will need the plan review and emergency response services of the RCFD. And, staff has found that when combined with the proposed modified BSPP, all would have a cumulative impact on the region. The need for rescue, fire, hazardous materials, and EMS response is frequent yet not concentrated in this county because the distances between the projects are very great. Operating, under construction, or proposed power plants in the region in the area have or will have had any direct fire protection impacts mitigated to a level of less than significance.

Staff has previously analyzed the potential for fire protection cumulative impacts at many other power plant projects located in California as well as in the region of the proposed modified BSPP. A significant cumulative fire protection impact is defined as the simultaneous emergency at multiple locations that would require the concurrent response for rescue, fire fighting, hazardous materials spill control, and/or EMS response. Existing locations that would likely need emergency response, or locations where such facilities might likely be built, were both 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 the work environment, spills, and fires. The chances of one event requiring a concerted response from the RCFD is high because accidents do happen at industrial environments. However, the chance of two or more occurring simultaneously, with resulting draw-down of fire department resources to the point of endangering other communities with lack of fire department coverage are not as great. Staff believes the risk of draw-down is less than significant.

The project owner will develop and implement a fire protection program for the modified BSPP independent of any other projects considered for potential cumulative impacts.

Staff believes that the facility, as proposed by the project owner and with the additional mitigation measures proposed by staff, poses a less than significant cumulative risk.

CONTRIBUTION OF THE MODIFIED BSPP TO CUMULATIVE IMPACTS

Construction. The construction of the modified BSPP is not expected to result in short term adverse impacts related to 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 modified BSPP, however, short term impacts related to fire protection during construction of those cumulative projects are not expected to occur.

Operation. The operation of the modified BSPP is expected to result in small long term adverse impacts during operation of the project related to fire protection and staff has recommended mitigation in the form of **WORKER SAFETY-7** to reduce that impact to a less than significant level.

NOTEWORTHY PUBLIC BENEFITS

The construction and operation of a solar power plant such as the proposed modified BSPP requires smaller quantities of hazardous materials and materials that are less dangerous to the public than a natural-gas fired power plant or a solar thermal plant using heat transfer fluid. Building solar power plants to supply the required energy in California therefore benefits the public by reducing the risks otherwise associated with the use and transport of large quantities of more hazardous materials such as aqueous or anhydrous ammonia.

RESPONSE TO COMMENTS

No comments on the modified BSPP have been received on the topics of worker safety or fire protection.

CONCLUSIONS

Staff concludes that if the proposed modified BSPP project owner provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by revised Conditions of Certification **WORKER SAFETY-1** revised to remove certain worker safety requirements for a concrete batch plant and fuel depot that would no longer exist in the modified project, and **WORKER SAFETY -2** (revised to remove certain worker safety requirements for a concrete batch plant and fuel depot that would no longer exist in the modified project plus the addition of a safety plan to address electric shock from active PV panels) and fulfils the requirements of existing Conditions of Certification **WORKER SAFETY-3**, **4,** and **5,**, revised **WORKER SAFETY-6**, **7, 8,** and **9**, and proposed new **WORKER SAFETY-10** and **11** the project would incorporate sufficient measures to ensure adequate levels of industrial safety and fire protection and comply with applicable LORS. Staff also concludes that the operation of this power plant would have a small yet significant individual direct impact on the RCFD and has proposed mitigation that would reduce this impact to a level of insignificance.

PROPOSED CONDITIONS OF CERTIFICATION/ MITIGATION MEASURES

Staff proposes modifications to the **Worker Safety & Fire Protection** Conditions of Certification as shown below. (Note: Deleted text is in strikethrough, new text is bold and underlined.)

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;
- **<u>A Construction Flood Safety Plan;</u>** 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 Injury and Illness Prevention Program, **<u>the Construction Flood Safety Plan</u>**, and the Heat Stress Protection Plan 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.

<u>Verification:</u> 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.

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 **<u>that includes safety measures, engineering controls, and BMPs to address potential electrical shock hazards in the event of fire</u>**;
- 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~~
- **<u>An Operations Flood Safety Plan</u>**; 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, **<u>an Operations Flood Safety Plan</u>**, 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.

<u>Verification:</u> 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.

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.

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.

Verification: At least 60 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.

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 60 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 and at least 20 feet wide.~~

~~c~~ **b**. 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, ~~gravel road,~~ and to maintain the road~~s~~ shall be submitted to the Riverside County Fire Department for review and comment and to the CPM for review and approval.

Verification: At least sixty (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 thirty (30) days prior to the start of site mobilization, the project owner shall submit final plans plus the road maintenance plan to the CPM 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, either individually or in conjunction with a power generation industry association or group that negotiates on behalf of its members, with the Riverside County Fire Department (RCFD) regarding funding of its project-related share of capital and operating costs to build and operate new fire protection/response infrastructure and provide appropriate equipment as mitigation of project-related impacts on fire protection services within the jurisdiction;~~ ~~**or**~~

~~(2) Shall~~ fund its share of capital costs in the amount of ~~$825,000~~ $250,000 and provide an annual payment of ~~$375,000~~ $100,000 to the RCFD for the support of ~~new fire department staff and~~ construction, operations and maintenance commencing with the start of ~~construction~~ **site mobilization** and continuing annually thereafter on the anniversary until the final date of power plant **non-operation and facility closure.**

~~**Verification:**~~ At least thirty (30) days prior to the start of site mobilization, the project owner shall provide to the CPM~~:~~

~~(1) A copy of the individual agreement with the RCFD or, if the owner joins a power generation industry association, a copy of the bylaws and group's agreement/contract with the RCFD;~~ ~~**or**~~

~~(2) D~~documentation that the amount of ~~$850,000~~ $250,000 has been paid to the RCFD, documentation that the first annual payment of ~~$375,000~~ $100,000 has been made, and shall also provide evidence in each January Monthly Compliance Report during construction and the Annual Compliance Report during operation that subsequent annual payments have been made.

WORKER SAFETY-8 The project owner shall develop and implement an enhanced Dust Control Plan that includes the requirements described in **AQ-SC3** and additionally requires:

1. Site worker use of dust masks (NIOSH N-95 or better) whenever visible dust is present;

2. ~~Implementation of methods equivalent to Rule 402 of the Kern County Air Pollution Control District (as amended Nov. 3, 2004); and~~ **No downwind PM10 ambient concentrations to increase more than 50 micrograms per cubic meter above upwind concentrations as determined by simultaneous upwind and downwind sampling. High-volume particulate matter samplers or other EPA-approved equivalent method(s) for PM10 monitoring shall be used. Samplers shall be:**

 a. Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate EPA-published documents for EPA-approved equivalent methods(s) for PM10 sampling;

 b. Reasonably placed upwind and downwind of the large operation based on prevailing wind direction and as close to the property line as feasible, such that other sources of fugitive dust between the sampler and the property line are minimized; and

 c. Operated during active operations.

3. 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 µg/m^3.

Verification: At least 60 days prior to the commencement of site mobilization, the enhanced Dust control Plan shall be provided to the CPM for review and approval.

~~**WORKER SAFETY-9** The project owner shall participate in annual training exercises with the Riverside County Fire Department (RCFD). The project owner shall coordinate this training with other Energy Commission-licensed solar power plants within Riverside County such that this project shall host the training on a rotating yearly basis with the other solar power plants.~~

~~**Verification:** At least 10 days prior to the start of commissioning, the project owner shall submit to the CPM proof that a joint training program with the RCFD is established. In each January Monthly Compliance Report during construction and the Annual~~

~~Compliance Report during operation, the project owner shall include the date, list of participants, training protocol, and location of the annual joint training.~~

WORKER SAFETY-9 **The project owner shall submit to the Riverside County Fire Department (RCFD) all plans and schematic diagrams that show the details of all fire detection and suppression systems and shall pay the RCFD its usual and customary fee for the review of those plans and inspection of the site to ensure compliance with those plans. The project owner shall provide proof to the CPM that the plans have been submitted to the RCFD on a timely basis and a copy of the comments received from the RCFD.**

Verification: **In each Monthly Compliance Report during construction, the project owner shall include any and all comments received from the RCFD on fire detection and suppression systems and proof that the required plan review and inspection fees have been paid to the fire department.**

During operation, the project owner shall provide proof in the Annual Compliance Report that the required inspection fees have been paid to the fire department.

WORKER SAFETY-10 **The project owner shall report to the CPM within 24 hours of any incidence of heat illness (heat stress, exhaustion, stroke, or prostration) occurring in any worker on-site and shall report to the CPM the incidence of any confirmed case of Valley Fever in any worker on the site within 24 hours of receipt of medical diagnosis.**

Verification: **The project owner shall provide reports of heat-related and Valley Fever incidences in any worker on the site via telephone call or e-mail to the CPM within 24 hours of a heat-related occurrence or confirmed diagnosis of a case of Valley Fever, and shall include such reports in the Monthly Compliance Report during construction and the Annual Compliance Report during operation.**

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Worker Safety/Fire Protection Appendix A

6/6/2013

Staff's Emergency Response Matrix

Estimated Values for Riverside County

Needs Criteria	points	weight factor	Genesis	Palen	Blythe	Rice
1. Learning, understanding, and training		0.15				
a. minimal need	1				1	
b. average need	3		3	3		3
c. significant need	5					
2. Inspections		0.10				
a. minimal need	1				1	
b. average need	3		3	3		3
c. significant need	5					
		Net -->	*0.3*	*0.3*	*0.1*	*0.3*
3. Fire		0.30				
A. Quantity liquid fuel or hydrogen gas stored on-site		0.10				
a. <1,000 gal or <1000 lbs hydrogen gas	1			1	1	1
b. >1000 and <100,000 gal or <10,000 lbs hydrogen gas	2					
c. >100,000 gal or >10,000 lbs hydrogen gas	6		6			
		Net -->	*0.60*	*0.10*	*0.10*	*0.10*
B. Fire/Explosion off-site consequences		0.20				
a. Limited to site	1		1	1	1	1
b. Potential for smoke and/or fire and/or minor blast effects off-site	2					
c. Potential for major fire/blast structure damage and/or injuries/fatalities off-site and/or major hwy disruption/closure	5					
d. Potential for fire at elevated platforms (score 0, 1, 2, or 3)			1	3	0	3
		Net -->	*0.40*	*0.80*	*0.20*	*0.80*
4. HazMat		0.10				
A. Proximity to sensitive receptors		0.075				
a. no sig quant of hazmats or no potential for off-site impacts within 1/2 mile	1		1	1	1	1
b. <5 receptors within 1/2 mile	2					
c. 5-10 receptors within 1/2 mile	3					
d. >10 within 1/2 mile	4					
		Net -->	*0.08*	*0.08*	*0.08*	*0.08*
B. Hazmat response time		0.025				
a. <30 minutes	1				1	
b. 30 - 60 minutes	3		3	3		
c. >60 minutes	4					4
		Net -->	*0.08*	*0.08*	*0.03*	*0.10*
5. Rescue		0.20				
a. low need and difficulty or on-site capability	1				1	1
b. medium need and difficulty	3		3	3		
c. high need and difficulty	5					

		Net -->		*0.60*	*0.60*	*0.20*	*0.20*
6. EMS							
EMS response time		0.15					
a. in-house EMT	1						1
b. <30 minute response time	3				3	3	
c. >30 minute response time	5			5			
		Net -->		*0.75*	*0.45*	*0.45*	*0.15*
Sum weighting factors		**1.00**					
TOTAL SCORE			======>	2.80	2.40	1.15	1.73
LOW Priority: additional resources and mitigation may be needed.	0.1 - 1.5						
MEDIUM Priority: additional resources and mitigation needed.	>1.5 - 2.5						
HIGH Priority: very significant need for additional resources and mitigation.	>2.5 - 3.5						
VERY HIGH Priority: urgent need for additional resources and mitigation.	>3.5						

Engineering Assessment

FACILITY DESIGN

Testimony of Shahab Khoshmashrab

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, as stated in this section, would ensure compliance with these laws, ordinances, regulations and standards.

INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Blythe Solar Power Project (BSPP) and is not intended as a California Environmental Quality (CEQA) analysis. The purpose of this analysis is solely 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, in a manner that also ensures 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 ensure public health and safety and comply with all applicable engineering LORS.

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; BSPP 2013a, Appendices B and D). 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	2010 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)

SETTING AND EXISTING CONDITIONS

The BSPP 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) and in the Petition to Amend, Appendices B and D (BSPP 2013a).

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 and 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, and BSPP 2013a, Appendices B and D 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.)

BSPP shall be designed and constructed to the 2010 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 2010 CBSC takes effect, the 2010 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 BSPP 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 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.

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 and operation of power generating facilities. This section is not intended to address environmental impacts under CEQA.

CUMULATIVE IMPACT ANALYSIS

The Facility Design section is not intended to address environmental impacts under CEQA.

COMPLIANCE WITH LORS

A detailed discussion of the proposed project's compliance with LORS applicable to facility design is provided above in subsection entitled **Assessment of Impacts and Discussion of Mitigation**.

NOTEWORTHY PUBLIC BENEFITS

The construction of the project in compliance with the latest applicable engineering codes reduces the potential for injury and death to workers and the public.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments which relate to facility design.

CONCLUSIONS

The laws, ordinances, regulations and standards (LORS) identified in the Petition to Amend 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 BSPP 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 2010 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.

PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

All the **Facility Design** conditions of certification remain unchanged except for the changes proposed below. (**Note:** Deleted text is in ~~strikethrough~~, new text is **<u>bold and underlined.</u>**)

The currently applicable edition of the CBSC (2010) has replaced the older edition (2007).

Condition of Certification **GEN-2** contains a table of major structures associated with the approved project. Many of these structures do not apply to PV technology. The table has been replaced accordingly.

Condition of Certification **GEN-5** calls for a design engineer who is: “fully competent and proficient in the design of power plant structures and equipment supports.” A PV project lacks conventional power plant structures and equipment supports. This part of the condition has been revised accordingly.

Condition of Certification **MECH-1** lists several LORS that may no longer be applicable to the construction of a project that employs the PV technology instead of the solar thermal technology. These LORS have been deleted.

Condition of Certification **MECH-2** lists requirements for pressure vessels which would not be a part of a PV project. This condition of certification has been deleted.

Condition of Certification **ELEC-1** lists voltages that do not apply to a PV project. Items A.1 and B.1 within **ELEC-1** have been revised accordingly.

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the ~~2007~~**<u>2010</u>** 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, or maintenance 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~~**2010** CBSC is in effect, the ~~2007~~**2010** 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 drawing and master specifications lists. The schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by 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, the master drawing and master specifications lists of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 2**, below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

~~Facility Design Table 2~~
~~Major Structures and Equipment List~~

~~**Equipment/System**~~	~~**Quantity (Plant)**~~
~~Steam Turbine Generator Foundation and Connections~~	~~4~~
~~Start-up Boilers Foundations and Connections~~	~~4~~
~~Generator Step-up Transformer Foundation and Connections~~	~~4~~
~~Overflow Vessel Foundation and Connections~~	~~8~~
~~Expansion Vessel Foundation and Connections~~	~~8~~
~~Weather Station Building Structure, Foundation and Connections~~	~~4~~
~~HTF Pumps Lube Oil Unit Foundation and Connections~~	~~8~~
~~Balance of Plant Electrical Building Structure, Foundation and Connections~~	~~4~~
~~Ullage Coolers and Vessel~~	~~4~~
~~Reheaters Foundation and Connections~~	~~8~~
~~MCC Cooling Tower Foundation and Connections~~	~~4~~
~~Gland Condenser Foundation and Connections~~	~~4~~
~~Lube Oil Console~~	~~4~~
~~Deaerator Foundation and Connections~~	~~4~~
~~LP/HP Pre-Heaters~~	~~4~~
~~Main Auxiliary Transformers Foundations and Connections~~	~~4~~
~~Air-cooled Condenser Structure, Foundation and Connections~~	~~4~~
~~Oil/Water Separator Foundation and Connections~~	~~4~~
~~Compressed Air System Foundation and Connections~~	~~4~~
~~Generator Circuit Breaker Foundation and Connections~~	~~4~~
~~Warehouse Building Structure, Foundation and Connections~~	~~4~~
~~Chemical Injection Skid Foundation and Connections~~	~~4~~
~~Cooling Tower Structure Foundation and Connections~~	~~4~~
~~Water Tank Structure, Foundation and Connections~~	~~4~~
~~Take Off Tower Structure, Foundation and Connections~~	~~4~~
~~Blowdown Tanks Structure, Foundation and Connections~~	~~8~~
~~Sample Panel and Lab Building Structure, Foundation and Connections~~	~~4~~
~~Demineralized Water Tank Structure, Foundation and Connections~~	~~4~~
~~Administration Building Structure, Foundation and Connections~~	~~4~~
~~Control Building Structure, Foundation and Connections~~	~~4~~
~~Pipe Racks~~	~~1 Lot~~
~~Treated Water Tank Structure, Foundation and Connections~~	~~4~~
~~Pumps Foundation and Connections~~	~~1 Lot~~
~~Solar Field Reflectors and Receivers Foundations and Connections~~	~~1 Lot~~
~~Drainage Systems (including sanitary drain and waste)~~	~~1 Lot~~
~~High Pressure and Large Diameter Piping and Pipe Racks~~	~~1 Lot~~
~~HVAC and Refrigeration Systems~~	~~1 Lot~~
~~Temperature Control and Ventilation Systems (including water and sewer~~	~~1 Lot~~

~~Equipment/System~~	~~Quantity (Plant)~~
~~connections)~~	
~~Building Energy Conservation Systems~~	~~1 Lot~~
~~Substation, Switchboards, Transformers, Buses and Towers~~	~~1 Lot~~
~~Electrical Cables/Duct Banks~~	~~1 Lot~~
~~Prefabricated Assemblies~~	~~1 Lot~~

Facility Design Table 2
Major Structures and Equipment List

Equipment/System	**Quantity (Plant)**
PV Module	**6,000,000**
PV Racking System[1]	**71,500**
Step-up Transformer Foundation and Connections	**4**
Power Conversion Station Foundation and Connections	**250**
Met Station Foundation and Connections	**4**
Circuit Breaker Foundation and Connections	**29**
Operation and Maintenance Facility Building Structure, Foundation and Connections	**1**
Raw/Fire Water Tank Structure, Foundation and Connections	**1**
Demineralized Water Tank Structure, Foundation and Connections	**1**
Potable Water Tank Structure, Foundation and Connections	**1**
Drainage System (including sanitary drain and waste)	**1 Lot**
HVAC Systems	**1 Lot**
Temperature Control and Ventilation Systems (including water and septic connections)	**1 Lot**
Building Energy Conservation Systems	**1 Lot**
Switchboards, Buses and Towers for Operations	**1 Lot**
Electrical Cables/Duct Banks	**4 Lots**

GEN-3 The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the ~~2007~~**2010** CBC, adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be otherwise agreed upon by the project owner and the CBO.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to 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

[1] **PV equipment quantities are based on the existing plant layouts**

(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 RE (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~~ **<u>PV plants and equipment support</u>**; 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, 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~~**2010** 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~~**2010** 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~~**2010** 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~~**2010** 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~~**2010** 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~~**<u>2010</u>** CBC.

<u>Verification:</u> 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~~**<u>2010</u>** 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.

<u>Verification:</u> 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~~**<u>2010</u>** CBC shall, at a minimum, be designed to comply with the requirements of that chapter.

<u>Verification:</u> 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.

<u>**Verification:**</u> 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~~**over 240** Volts **(V)** ~~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~~**34.5 kV systems and typical one-line diagrams for all systems under 34.5 kV and over 240 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~~ **all AC systems under 34.5 kV and over 240 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.

REFERENCES

BSPP 2013a - Blythe Solar Power Plant (09-AFC-6C), Revised Petition to Amend, dated 4/11/2013.

Solar Millennium 2009a - Solar Millennium (tn: 52937). Application for Certification Volumes1 & 2, dated 8/24/2009.

GEOLOGY AND PALEONTOLOGY

Testimony of Casey Weaver, CEG

SUMMARY OF CONCLUSIONS

The Modified Blythe Solar Power Project (Modified BSPP) 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, 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 2010) and Condition of Certification **GEO-1.** If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2010 CBC takes effect in January 2014, the 2010 CBC provisions shall be replaced with the updated provisions.

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 Modified BSPP should not have a significant impact on the availability of such resources. There are no other known viable geologic or mineralogic resources at the Modified BSPP site.

Based on independent research and review, Energy Commission staff believes that the potential is low for significant adverse impacts to the proposed project from geologic hazards during its design life and to potential geologic and mineralogic, resources from the construction, operation, and closure of the proposed project.

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, monitoring and curation by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-8** in areas where soils are exposed by conventional excavation operations.

In areas where photovoltaic (PV) panels are to be supported by posts that are driven into the ground, there may be impacts to paleontological resources – any resource present would be crushed without being identified. Existing studies indicate the soils beneath the solar field are likely to contain Pleistocene age vertebrate fossils. Staff has determined that based on existing information, the use of this construction method would result in a significant impact. .

In order to adequately mitigate for the potential impacts to paleontological resources in the subsurface soils where PV panels are proposed to be supported by posts, a subsurface paleontological characterization must be performed in accordance with Condition of Certification **PAL-9**. The characterization will allow for the refinement of various mitigation options including fossil recovery and data collection, avoidance, and modifications of post insertion to be implemented as appropriate to ensure significant impacts are mitigated.

INTRODUCTION

In this section, staff discusses the potential impacts of geologic hazards on the proposed Modified BSPP 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 recommended monitoring and mitigation measures for geologic hazards and geologic, mineralogic, and paleontologic resources as proposed Conditions of Certification.

METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The California Environmental Quality Act (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 (2010) 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 reviewed geologic and mineral resource maps for the surrounding area, site-specific information provided by the owner of the Approved BSPP project and the Modified BSPP project owner (NextEra Blythe Solar), and the original Revised Staff Assessment prepared by staff for the approved project, to determine if geologic and mineralogic resources exist in the area and to determine if project development 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, staff evaluated them against checklist questions posed in the 2013 CEQA Guidelines, Appendix G, Environmental Checklist established for Mineral Resources. These questions are:

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?

The impact of the proposed project and alternatives on mineral resources would be considered significant if they would directly or indirectly interfere with active mining claims or operations, or would result in reducing or eliminating the availability of important mineral resources.

Staff reviewed existing paleontological information and requested records searches from the Natural History Museum of Los Angeles County and the University of California Berkeley online database for the site area to determine if paleontological resources exist in the area and to determine if project development could adversely affect paleontological resources. Site-specific information generated by the owner of the Approved BSPP project 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 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 (PYFC) system. This system includes three conditions (Condition 1 [areas known to contain vertebrate fossils]; Condition 2 [areas with exposures of geological units or settings that have high potential to contain vertebrate fossils]; and Condition 3 [areas that are very unlikely to produce vertebrate fossils]). The PYFC class ranges from Class 5 (very high) for Condition 1 to Class 1 (very low) for Condition 3 (USDI 2007).

The existing conditions of certification allow the Energy Commission's compliance project manager (CPM) and the project owner 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.

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 Modified BSPP facility site is located entirely on land currently administered by the 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.
National Environmental Policy Act (NEPA) of 1970 (42 USC 4321, et. seq.)	Established the Council on Environmental Quality (CEQ) in the Executive Office of the President, which is charged with preserving 'important historic, cultural, and natural aspects of our national heritage'.
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), 2010	The CBC (2010) 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.

Applicable Law	Description
Warren-Alquist Act, PRC, sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission to “give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites…” With respect to paleontologic resources, the Energy Commission relies on guidelines from the Society for Vertebrate Paleontology, indicated below.
California Environmental Quality Act (CEQA), PRC sections 15000 et seq., Appendix G	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.
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 (2010). Requires mitigation measures for geologic hazards, including seismic shaking, surface rupture (adopts APEFZ Act), liquefaction, unstable soils and slopes, and flooding.
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.
Standards	
Society for Vertebrate Paleontology (SVP), 2010	The “Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures” is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 and revised in 2010 by the SVP, a national organization of professional scientists.
Bureau of Land Management (BLM) Instructional Memorandum 2008-009	Provides up-to-date methodologies for assessing paleontological sensitivity and management guidelines for paleontological resources on lands managed by the Bureau of Land Management.

PROPOSED PROJECT

NextEra Blythe Solar (Applicant) proposes to develop Modified BSPP using photovoltaic (PV) electric generating technology. The project would be developed in four operational phases designed to generate a total of approximately 485 MW nominal of electricity. The first three units (phases) would consist of approximately 125 MW alternating current (AC) of nominal of electricity each. The fourth unit would generate approximately 110 MW AC.

The transmission corridor is located in the center of the site with the exact location to be determined during final design. The applicant has not selected the specific PV modules nor has it decided on whether a tracker system, fixed tilt system, or combination of the two systems would be installed. Therefore, the analysis of the impacts associated with the Modified BSPP assumes a worst-case in terms of the technology employed. The applicant is requesting the Final Decision be amended in such a way as to allow the specific combination of technologies to be selected prior to construction without the need for filing another amendment. Because of the industry’s rapid development and advancement in PV technology, the equipment shown for each unit is only representative of one type of technology that could be selected in the final design.

During operations, all four units would share a common operations and maintenance (O&M) facility, one on-site switchyard, access and maintenance roads (either dirt, gravel, or paved), perimeter fencing and other ancillary security facilities, and a double-circuit 230 kV gen-tie transmission line. The Modified BSPP would be located entirely on public land within Bureau of Land Management (BLM) right-of-way (ROW) # CACA – 048811.

The total proposed ROW acreage for the solar plant site is approximately 4,070 acres excluding linear facilities outside of the proposed solar plant site.

SETTING AND EXISTING CONDITIONS

Depending on the published reference, the proposed Modified BSPP 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. The region is more characteristic of the Mojave Desert geomorphic province in terms of geology, structure and physiography. The Mojave Desert is a broad interior region of isolated mountain ranges that separate vast expanses of desert plains and interior drainage basins. The physiographic province is wedge-shaped, and separated from the Sierra Nevada and Basin and Range geomorphic provinces by the northeast-striking Garlock fault on the northwest side. The northwest-striking San Andreas fault defines the southwestern boundary, beyond which lie the Transverse Ranges and Colorado Desert geomorphic provinces. The topography and structural fabric in the Mojave Desert is predominately southeast to northwest, and is associated with similarly-oriented faulting similar to the San Andreas fault. A secondary east to west orientation correlates with structural trends in the Transverse Ranges geomorphic province. The project site is located within the Palo Verde Mesa. This alluvial-filled basin is bounded by the McCoy Mountains, Little Maria Mountains, and Big Maria Mountains to the west, northwest, and northeast, respectively, and extends southwest to the Palo Verde Mountains (USGS 1973). The Palo Verde Mesa is bounded by the Palo Verde Valley to the east, which is generally formed by flood plain deposits of the Colorado River (USGS 1973).

The proposed Modified BSPP site would be situated on the alluvial-filled basin of the Palo Verde Mesa just east of the McCoy Mountains. Overall, the proposed site gently slopes down from the McCoy Mountains in the west in a southwesterly direction at an approximate gradient of less than 1% toward the low topographic elevations of the Palo Verde Valley. Locally, steeper grades up to 15% are present along the western side of an unnamed mound beyond the northeast corner of the project area. The site topographic elevation within the plant site varies from 830 feet above mean sea level (msl) in the west to 410 feet above msl in the east.

The Modified BSPP site is underlain by younger and older Quaternary age alluvium and alluvial deposits (CDMG 1967; USGS 1990; USGS 2006; Solar Millennium 2009a). Marine and transitional sediments of the Pliocene age Bouse formation are presumed to underlie these Quaternary deposits (USGS 1968; Solar Millennium 2009a), and metasedimentary bedrock of the McCoy Mountains formation outcrops in the McCoy

Mountains (Harding and Coney 1985). The local stratigraphy as interpreted by several authors is presented in **Geology and Paleontology Table 2**.

Holocene age alluvium of modern washes from the McCoy Mountains is mapped as west-east-trending individual strips in the west-center and southern portions of the Modified BSPP site surface. The width of these washes varies along their path and can be as wide as 1,500 feet in some areas. The modern alluvium washes generally contain unconsolidated, angular to subangular gravel and sand derived from the McCoy Mountains and will include boulder- and cobble-rich wash deposits in the proximity of the McCoy Mountains. The alluvium wash deposits grade laterally towards the eastern portion of the site into Holocene age alluvial fan and alluvial valley deposits. The younger alluvium deposits are characterized by the lack of desert varnish, generally fine grain size, and evidence of sediment transport that could have occurred within the last 2,000 years. The younger alluvium deposits generally form a very gently sloping to nearly flat surface and consist of sand, pebbly sand, and sandy pebble-gravel (USGS 2006).

Geology and Paleontology Table 2
Correlation and Ages of Stratigraphic Units

<table>
<tr><th>Age</th><th>Unit/Description</th><th>Jennings (CDMG 1967)</th><th>Stone (USGS 1990)</th><th>Stone (USGS 2006)</th></tr>
<tr><td rowspan="2">Holocene</td><td>Alluvium of modern washes</td><td rowspan="2">Qal</td><td>Qw</td><td>Qw</td></tr>
<tr><td>Alluvial-fan and alluvial-valley deposits</td><td rowspan="3">QTa</td><td>Qa_6</td></tr>
<tr><td>Holocene ± Pleistocene</td><td>Alluvial-fan deposits (Intermediate Alluvium)</td><td rowspan="2">Qc</td><td>Qa_3</td></tr>
<tr><td>Pleistocene</td><td>Alluvial deposits of Palo Verde Mesa</td><td>Qpv</td></tr>
<tr><td>Pleistocene ± Pliocene</td><td>Alluvial deposits of the McCoy Wash area</td><td>QP</td><td>QTfg</td><td>QTmw</td></tr>
<tr><td>Pleistocene ± Miocene</td><td>Alluvial-fan and alluvial-valley deposits (Older Alluvium)</td><td>Qc_o</td><td>QTdf</td><td>QTa_2</td></tr>
<tr><td>Pliocene ± Miocene</td><td>Bouse Formation*</td><td>Pu</td><td>Tbx</td><td>Tbx</td></tr>
<tr><td>Cretaceous and Jurassic?</td><td>McCoy Mountains Formation**</td><td>ms, mv</td><td>Km*(x)*, Kja, Kima?</td><td>Km*(x)*, Kja, Kima?</td></tr>
</table>

*Not mapped at the surface within the project area and expected to present at depth below the alluvial-filled basin.
** Mapped only in a small portion at the southwest corner and expected to present at shallow depths near the McCoy Mountains.

The intermediate alluvium, Holocene to Pleistocene in age, occurs as desert varnished pavement surfaces generally in the western half of the Modified BSPP site and as small isolated strip surfaces between younger alluvium deposits in the eastern half of the site. These alluvial-fan deposits of gravel and sand form relatively old, dissected surfaces and are generally characterized by smooth, varnished desert pavement. Most of the intermediate alluvium surfaces have a dark brown to nearly black desert varnish and can be distinguished by the change in color on aerial photographs. Older alluvium is mapped as high and deeply dissected narrow ridges away from the McCoy Mountains along the western margin of the site, and is interpreted to be older than 1.2 Ma. These older alluvial-fan deposits of fine to coarse, poorly sorted gravel and sand generally form sharp to rounded ridge crests and presumably have been eroded to a level below that of any pre-existing alluvial surfaces (USGS 2006). The approximate transitions from Pleistocene to Holocene age sediments is marked by the change from older alluvium that exhibits an erosional, dissected surface to a setting in which neither deposition nor erosion is occurring (intermediate alluvium), and then to areas undergoing active fan deposition (younger alluvium).

The Pleistocene age alluvial deposits of the Palo Verde Mesa are mapped near the southeastern corner of the site. These unconsolidated to weakly consolidated deposits of sand, gravelly sand, silt, and clay form the lower portion of the Palo Verde Mesa and are mapped approximately 60 feet below the upper portion of the Palo Verde Mesa (alluvial filled basin). This unit extends up to the Colorado River flood plain to the east. The Pleistocene and/or Pliocene age alluvial deposits of the McCoy Wash area are mapped in the southeastern end and along the eastern edge of the Modified BSPP site. This alluvial unit consists of rounded river gravel and minor locally derived gravel that is underlain by well consolidated calcareous or gypsiferous sandstone, and forms two broad hills standing 50 to 80 feet above the Palo Verde Mesa. The stratigraphic relations between the alluvial deposits of the McCoy Wash area and the Palo Verde Mesa are unclear (USGS 2006).

Interbedded clay, silt, sand, limestone and tufa of the Bouse formation were deposited in a marine to brackish water environment during the Pliocene epoch in Coachella Valley (USGS 1968; USGS 2006). The sediments were deposited in a marine embayment of the Gulf of California that encroached northward into the Colorado River Valley during the late Tertiary period. The nearest exposure relative to the proposed Modified BSPP site is mapped at the eastern side of the Big Maria Mountains approximately 10 miles northeast of the northeastern corner of the project site (USGS 1968), and is mapped as interpreted landslide deposits in the McCoy Mountains approximately 6 miles west of the western boundary of the project site. The depth to the Bouse formation below the Palo Verde Mesa alluvium deposit is unknown and is expected to be at least several hundred feet based on the site topography and the available depth to the Bouse formation along the Colorado River (USGS 1968; USGS 1973). The McCoy Mountains formation is mapped as a small area in the southwestern corner of the site. Weakly metamorphosed sandstone and conglomerate, and lesser shale, mudstone and siltstone, of the Cretaceous age McCoy Mountains formation are the predominant lithologies in the McCoy and Palen Mountains (CDMG 1967; USGS 1968; USGS 1990; USGS 2006). The quartzose members of the McCoy Mountains formation are believed to be as old as Late Jurassic age (USGS 2006).

A preliminary geotechnical investigation including 30 exploratory borings and 16 test pits has been completed for the general area of the approved BSPP site (Kleinfelder 2009). The proposed Modified BSPP site overlies the Approved BSPP site. Therefore, the conditions described for the Approved BSPP site apply to the Modified BSPP and are repeated here to describe the Modified BSPP site. The geotechnical investigation report does not cover the alignment of the project off-site linears to the south. The preliminary geotechnical investigation reveals that the approved BSPP site is underlain by younger and older alluvium that generally consists of sand and gravel to the maximum depth of exploration (approximately 76.5 feet below the existing ground surface).

The Modified BSPP 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 dense to very dense poorly graded sand, silty sand and clayey sand to poorly graded gravel with sand. Very stiff to hard fine grain soils and sandy clays are locally present as interbedded layers of 1 to 3 feet thickness at depths generally greater than 15 feet below existing grade. The near surface site soils are primarily granular with no to low swell potential. Collapse potential tests indicate the site soils exhibit a collapse potential in the range of 0 to 3.6% when inundated with water.

The proposed Modified BSPP plant site is not crossed by any known active faults or designated Alquist-Priolo Earthquake Fault Zones (EFZs, 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.. Several northwest-striking basement faults are mapped at the nearby McCoy, Big Maria, and Little Maria Mountains (CDMG 1967; USGS 1984, USGS 1990, USGS 2006). The faults are part of a major Mesozoic terrain-bounding structural zone that was active during late Jurassic time, and are associated with folding and metamorphism of the McCoy Mountains formation. The basement faults are no longer active, and are not exposed anywhere on the surface of the proposed site. The Blythe Graben is mapped as cutting the Quaternary alluvial deposits about 6 miles northeast of the project site; its tectonic significance is unknown (USGS 2006).

The ground water depth beneath the Modified BSPP site is not precisely known and is expected to vary with the site topographic elevation. Site-specific exploration conducted in association with the preliminary geotechnical evaluation indicates that ground water does not occur within 76.5 feet of the existing ground surface (Kleinfelder 2009). The preliminary geotechnical report indicates that ground water was measured between 193 and 195 feet below the existing ground surface at the project site (Kleinfelder 2009). Data from wells within the Palo Verde drainage basin, which was obtained from the online water data library of the California Department of Water Resources (CDWR 2009), show historic ground water levels between 150 and 165 feet below ground surface in a number of wells just south of the project site near the Blythe airport. Further, the ground water elevations were reported to be between 254 to 262 feet above msl within the project area (USGS 1973). Therefore, the depth to ground water within the site boundaries is generally expected to be greater than 150 feet below existing grade, with the depth typically increasing with increasing site topographic elevation.

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.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking, hydrocompation, dynamic compaction, 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 Modified BSPP 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 Modified BSPP project 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 the paleontologic literature and records search conducted by the Natural History Museum of Los Angeles County (McCleod 2009). Site-specific information generated by the owner of the approved BSPP 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 included as part of the project's approval.

As stated above, existing information indicates that site soils have a high probability of containing fossils. The approved project proposed substantial site grading and excavation. Using conventional excavation methods, fossils encountered during construction would have been uncovered, discovered, collected and recorded, thereby contributing to the scientific understanding of the paleoclimate and paleobiology of the area. The proposed project would use a different construction methodology. Rather than parallel rows of mirrors suspended on level linear lattice structures, the proposed project would install 213,885 individual pole structures (posts) to support PV panels. Each post would be driven or screwed through the soil column to a final depth of approximately 13feet below ground surface. This method of construction does not utilize excavation and there is no retrieval of subsurface soils or any fossils contained within those soils. In effect, any fossils that are in the path of post insertion would be permanently destroyed with no recovery, discovery or scientific benefit realized.

Staff has determined that based on existing information, the use of this technology would result in a significant impact.

In order to adequately mitigate for the potential impacts to paleontological resources in the subsurface soils where PV panels are proposed, a subsurface paleontological characterization must be performed in accordance with Condition of Certification **PAL-9**. The characterization will allow for the refinement of various mitigation options including fossil recovery and data collection, avoidance, and modifications of post insertion to be implemented as appropriate to ensure significant impacts are mitigated.

The existing and modified conditions of certification allow the Energy Commission's CPM and the project owner to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geologic hazards and the protection of geologic and mineralogic resources.

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 (2010) requirements and proposed Condition of Certification **GEO-1**. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2010 CBC takes effect in January 2014, the 2010 CBC provisions shall be replaced with the updated provisions.

Staff's independent research included the review of available geologic maps, reports, and related data of the proposed Modified BSPP plant site. Geologic information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG, now known as CGS), the United States Geological Survey (USGS), the American Geophysical Union, the Geologic Society of America, the Southern California Earthquake Data Center (SCEDC), and other organizations.

Faulting and Seismicity

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 Modified BSPP 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** (Blake 2000a; CDMG 1994b). Because of the large size of the proposed site the distances to faults were measured from the approximate center of the site.

Geology and Paleontology Table 3
Active Faults Relative to the Proposed Blythe 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	58.8	6.4	0.049	Right-Lateral Strike Slip (Northwest)	A
San Andreas: Coachella M-1c-5	59.0	7.2	0.075	Right-Lateral Strike Slip (Northwest)	A
San Andreas SB-Coachella M-1b-2	59.0	7.7	0.098	Right-Lateral Strike Slip (Northwest)	A
San Andreas: Whole	59.0	8.0	0.115	Right-Lateral Strike Slip (Northwest)	A
Elmore Ranch	59.8	6.6	0.054	Left-Lateral Strike Slip (Northeast)	B

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.

Five Type A and B faults and fault segments were identified within 63 miles of the proposed Modified BSPP site (**Geology and Paleontology Table 3).** Of these, none are within 59 miles of the site. Four 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. The closest mapped active faults to the plant site are the faults attributed to the Brawley Seismic Zone located approximately 59 miles to the southwest. The Brawley Seismic Zone is a linear seismic zone associated with the right step between the Imperial fault and the Coachella section of the San Andreas fault (Treiman 1999). The Elmore Ranch fault is also a left-lateral strike-slip fault and is southwesterly oriented from the East Brawley Seismic Zone. All fault zones in **Geology and Paleontology Table 3** lie within designated Alquist-Priolo EFZs (CDMG 2003)

The proposed Modified BSPP 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 to 10 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 Modified BSPP 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, there are seventeen historic earthquakes of Magnitude 6.0 (M6.0) or greater that have occurred between 62 and 100 miles of the site (Blake

2000b). Most of these historic earthquakes are associated with the strike-slip faulting located over 60 miles southwest of the Modified BSPP site including the Brawley Seismic Zone, San Andreas Fault Zone-Coachella Section, San Jacinto Fault Zone, and Imperial fault. The occurrence of relatively large earthquakes demonstrates that the proposed site could be subject to moderate levels of earthquake-related ground shaking in the future. The effects of ground shaking would need to be mitigated, to the extent practical, through structural designs required by the California Building Code (CBC 2010) and the site-specific project geotechnical report required by the CBC and Condition of Certification **GEO-1**. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2010 CBC takes effect in January 2014, the 2010 CBC provisions shall be replaced with the updated provisions.

Preliminary estimates of ground motion based on probabilistic seismic hazard analyses have also been calculated for the project site using the USGS Earthquake Hazards application called the U.S. Seismic “DesignMaps” Web Application (**Geology and Paleontology Table 4**). This application produces seismic hazard curves, uniform hazard response spectra, and seismic design values. The values provided by this application are based upon data from the 2008 USGS National Seismic Hazard Mapping Project. These design parameters are for use with the 2012 International Building Code, the 2010 ASCE-7 Standard, the 2009 NEHRP Provisions, and their respective predecessors.

These parameters are project-specific and, based on Modified BSPP’s location, were calculated using latitude and longitude inputs of 33.64 degrees north and 114.75 degrees west, respectively. Other inputs for this application are the site “type” which is based on the underlying geologic materials and the “Structure Risk Category”. The assumed site class for Modified BSPP is “D”, which is applicable to stiff soil. These parameters can be updated as appropriate following the results presented in a project-specific geotechnical investigation report performed for the site. The assumed “Structure Risk Category” is “III”, which is based on its inherent risk to people and the need for the structure to function following a damaging event. Risk categories range from I (non essential) to IV (critical). Examples of risk category I include agriculture facilities, minor storage facilities, etc., while examples of category IV include fire stations, hospitals, nuclear power facilities, etc.

Geology and Paleontology Table 4
Planning Level 2010 CBC Seismic Design Parameters Maximum Considered Earthquake, ASCE 7 Standard

Parameter	Value
Assumed Site Class	D
Structure Risk Category	III - Substantial
SS – Mapped Spectral Acceleration, Short (0.2 Second) Period	0.425g
S1 – Mapped Spectral Acceleration, Long (1.0 Second) Period	0.217 g
Fa – Site Coefficient, Short (0.2 Second) Period	1.460
Fv – Site Coefficient, Long (1.0 Second) Period	1.967
SDS – Design Spectral Response Acceleration, Short (0.2 Second) Period	0.414 g
SD1 – Design Spectral Response Acceleration, Long (1.0 Second) Period	0.284 g
SMS – Spectral Response Acceleration, Short (0.2 Second) Period	0.620g
SM1 – Spectral Response Acceleration, Long (1.0 Second) Period	0.426 g

ASCE = American Society of Civil Engineers
Values from USGS 2010b

The ground acceleration values presented are typical for the area. Other developments in the adjacent area will also be designed to accommodate strong seismic shaking. The potential for and mitigation of the effects of strong seismic shaking during an earthquake should be addressed in a project-specific geotechnical report, per CBC 2010 requirements, and Condition of Certification **GEO-1** and Conditions of Certification **FACILITY DESIGN GEN-1**, **GEN-5** and **CIVIL-1**. Compliance with these conditions of certification would ensure the project is built to current seismic standards and potential impacts would be mitigated to insignificant levels in accordance with current standards of engineering practice.

The closest surface rupture is in the Brawley Seismic Zone approximately 59 miles southwest of Modified BSPP site. The potential for surface rupture on a fault at the solar power plant site and along its offsite linears is considered to be very low since no faults are known to have ruptured the ground surface in the region.

Liquefaction

Liquefaction is a condition in which a saturated cohesionless soil may lose shear strength because of a sudden increase in pore water pressure caused by an earthquake. However, the potential for liquefaction of strata deeper than approximately 40 feet below the ground surface is considered negligible due to the increased confining pressure and because geologic strata at this depth are generally too compact to liquefy.

The Modified BSPP site is located within an area with low to moderate level of liquefaction potential as per Riverside County Land Information System (RCLIA 2009). However, the dense to very dense nature of sandy and gravelly soils encountered in the Modified BSPP borings (Kleinfelder 2009), coupled with a ground water table depth of greater than 150 feet below the ground surface, indicates that there is no liquefaction potential at the Modified BSPP site (Kleinfelder 2009). No subsurface information is available along the project offsite improvements such that liquefaction potential for these areas of the project should be addressed in a project-specific geotechnical report as required by the CBC (2010) and proposed Condition of Certification **GEO-1**. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2010 CBC takes effect in January 2014, the 2010 CBC provisions shall be replaced with the updated provisions.

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 Modified BSPP site is not subject to catastrophic liquefaction-induced settlement, the potential for lateral spreading during seismic events would be negligible.

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 is soil density). The decrease in volume can result in settlement of overlying structural improvements. The proposed site is generally underlain by dense to very dense granular soils. However, there is a potential that loose sand layers occur both at the surface and as buried layers between the borings since the project site is situated on alluvial fan and alluvial valley deposits (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 (2010) and proposed Condition of Certification **GEO-1**. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2010 CBC takes effect in January 2014, the 2010 CBC provisions shall be replaced with the updated provisions.

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 Palo Verde Mesa 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 (2010) and proposed Condition of Certification **GEO-1**. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2010 CBC takes effect in January 2014, the 2010 CBC provisions shall be replaced with the updated provisions. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations depending on severity and foundation loads.

Subsidence

The Riverside County Land Information System indicates the alluvial filled basin sediments in the Palo Verde Mesa are susceptible to subsidence (RCLIA 2009). 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. No regional subsidence due to the historic ground water withdrawal has been reported in the Modified BSPP project area or in the site vicinity (Solar Millennium 2009a). Further, no localized or regional subsidence was recorded 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) in the general area of the project. Current ground water withdrawals are reportedly only approximately 2,000 acre-feet per year (ac-ft/yr), and even with the proposed project demand of an additional 40 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**. 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 dense to very dense granular site soils are indicative of low to negligible local subsidence.

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, capillary tension, water line breaks, etc. causes the clay soils to collect water molecules in their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements. The project geotechnical report does not include any expansion testing or plasticity index testing, which is an indicative of expansion potential. However, the soils encountered in the explorations are primarily granular soils and would pose insignificant expansion potential (Kleinfelder 2009).

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

Landslide potential at the Modified BSPP site is negligible since the proposed energy facility is located on a broad, gently southeast-sloping alluvial fan and alluvial valley deposits of the Palo Verde Mesa.

Flooding

The Federal Emergency Management Agency (FEMA 2009) indicates that the Modified BSPP site is in Zone D, which denotes areas in which flood hazards are undetermined but possible; however, no printed maps are available for the area. The Riverside County Land Information System indicates that the northern portion of the Modified BSPP site is within an area where flood plain review is required (RCLIA 2009). Because the proposed site is topographically higher than the Colorado River flood plain to the southwest, it is staff's opinion that the potential for flooding at the site is limited to infrequent high volume (flash flood) events that may occur due to heavy rainfall in the McCoy Mountains and Little Maria Mountains west and north of the site, respectively. Storm waters would be carried across the proposed site from roughly west to southeast via existing drainages. Site drainage would be modified during project construction to mitigate potential impacts due to catastrophic flooding (Solar Millennium 2009a). Additional information and analyses with respect to potential flooding is contained in the **Soil and Water Resources Section**.

Tsunamis and Seiches

The proposed Modified BSPP 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 Modified BSPP 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 et al. 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 VHA 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 Modified BSPP 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 very low. The potential impact would be limited to ashfall and, for such an impact, mitigation would be limited to cleaning the panels.

Geologic, Mineralogic, and Paleontologic Resources

Geologic and Mineralogic Resources

Staff has reviewed applicable geologic maps and reports for this area (CDC 2000; CDC 2001; CDMG 1967; CDMG 1968; CDMG 1990; CDMG 1994a; CDMG 1998; CDMG 1999; McCleod, 2009; Kleinfelder 2009; USGS 2006; and USGS 2009b). 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 Modified BSPP should not have a significant impact on the availability of such resources.

The proposed Modified BSPP site is mapped as Mineral Resource Zone (MRZ)-4 (CDMG 1994a). MRZ-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". The carbonate bedrock outcrop of Little Maria Mountains and metasedimets of the northern McCoy Mountains about 10 miles north and northwest of Modified BSPP site are designated as MRZ-3a, which is defined as "areas containing known mineral occurrences of undetermined mineral resource significance". The Big Maria Mountains to the northeast also covers a significant area that has been designated as MRZ-3a (CDMG 1994a).

There are a variety of active and past mining operations in the general area near the proposed project location, but no active operations or prospective mineral claims occur within the proposed project boundaries or along the offsite linears. The Black Jack Mine in the northern McCoy Mountains about 10 miles northwest of Modified BSPP 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 miles 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 3 miles southwest of the Modified BSPP 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 2009b). The Roosevelt and Rainbow group of mines in the Mule Mountain district, also known as the Hodges Mountain district that is located about 10 miles south of Modified BSPP site, have produced some gold and copper from the quartz veins in granitic rocks (CDMG 1998).

The Big and Little Maria Mountain Skarn Zone, a designated MRZ-3a area, is a broad 81-square-mile area about 10 miles north to northeast of the project site. It contains metamorphosed Paleozoic carbonate rocks including calcite, dolomite, and carbonaceous rocks. These contact metasomatic (skarn) deposits contain several minerals including iron, copper, lead, silver, zinc, tungsten, and gold (CDMG 1994a). There are several reported past and present mineral production operations in the Big and Little Maria Mountains (USGS 2009b). Gypsum is also produced in the Little Maria

Mountains in the Standard Gypsum Mine about 12 miles northwest of Modified BSPP site (CDMG 1999).

The closest reported mineral occurrence is just outside the southwestern corner of the Modified BSPP site. Continental Mining & Development, Co. maintains a claim (Record 10212796) for the presence of copper, as well as a claim (Record 10236929) for a uranium prospect near the southeast corner of the site (USGS 2009b; AECOM 2010).

Several active and former sand and gravel pits are located in the general area of the project including the Midland pit about 8 miles east of the eastern boundary of Modified BSPP site, just northeast of Blythe, California (CDMG 1999) and the Big Maria pit at the southern end of Big Maria Mountains about 8 miles east of the northeast corner of the project boundary (USGS 2009b). No active or former sand and gravel pits are located within the Modified BSPP project site; however, two former sand and gravel production pits are mapped just south of Modified BSPP site closer to the proposed project offsite alignment and may have been related to the construction of nearby I-10 (USGS 2009b).

The nearest oil and gas fields are located more than 150 miles west of Modified BSPP 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 60 miles southwest of Modified BSPP site (CDC 2000; CDC 2001).

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 offsite, 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 right-of-way (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

The potential for a geologic unit on a site to yield scientifically significant, nonrenewable paleontological resources is referred to as its paleontological sensitivity (SVP 1995). Paleontological sensitivity is a qualitative assessment made by a professional paleontologist taking into account the paleontological potential of the stratigraphic units present, the local geology and geomorphology, and any other local factors that may suggest a probability of encountering fossils.

Society of Vertebrate Paleontology Classification System

According to the Society of Vertebrate Paleontology (SVP) standard guidelines, sensitivity comprises (1) the potential for a geological unit to yield abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or paleobotanical remains, and (2) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecological, or stratigraphic data (SVP 1995). The SVP established three categories of sensitivity for paleontological resources in its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources. The three categories are low, high, and undetermined.

Low sensitivity paleontological resources are categorized as rock units that are not sedimentary in origin. Likewise, sedimentary rock units that have been well examined and have not produced paleontological resources are considered to have low sensitivity. Monitoring is not usually recommended or needed during excavation in a rock unit with low sensitivity.

High sensitivity paleontological resources are categorized as rock units older than recent for which vertebrate or significant invertebrate fossils or a significant suite of plant fossils have been recovered. In areas of high sensitivity, full-time monitoring is recommended during any project-related ground disturbance.

Paleontological resources with undetermined sensitivity are categorized as sedimentary rock units for which little information is available. It is often possible for an experienced paleontologist to determine whether such a rock unit should be assigned a high or low sensitivity after he or she has performed a pedestrian survey and has made detailed observations of both natural and artificial exposures of the rock unit.

Bureau of Land Management Paleontology Classification System

The U.S. Bureau of Land Management (BLM) has developed a recommended, potential fossil yield classification system for evaluating the likelihood that a given geological unit may yield fossils (BLM 2007, Chirstensen 2007). It is known as the Potential Fossil Yield Classification system (PFYC). This system makes further distinction between geologic units that may or may not contain sensitive paleontologic resources compared to the SVP standard guidelines. Excerpts from the classification system are summarized below.

Class 1 – **Very Low**. The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is non-existent or extremely rare.

These are geologic units that are not likely to contain recognizable fossil remains such as igneous or metamorphic rocks, excluding reworked volcanic ash units and/or units that are Precambrian in age or older. Management concern for paleontological resources in Class 1 units is usually negligible or not applicable. Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances.

Class 2 – **Low**. The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities would be managed on a case-by-case basis.

This class is characterized by sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. These units are generally younger than 10,000 years before present, or are recent eolian deposits or are sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration). Management concern for paleontological resources is generally low. Assessment or mitigation is usually unnecessary except in rare or isolated circumstances.

Class 3 – **Moderate** or **Unknown**. This classification includes a broad range of paleontological potential. It includes geologic units of unknown potential, as well as units having a moderate or infrequent occurrence of significant fossils. Management considerations cover a broad range of options as well, and could include pre-disturbance surveys, monitoring, or avoidance. Surface-disturbing activities will require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.

This class is characterized by fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential. The units are often marine in origin with sporadic known occurrences of vertebrate fossils.

Class 3a – **Moderate Potential**. Sedimentary units are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low. Management concern for paleontological resources is moderate or cannot be determined from existing data. Surface-disturbing activities may require field assessment to determine appropriate course of action.

Class 3b – **Unknown Potential**. Sedimentary units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this class may eventually be placed in another class when sufficient survey and research is performed. The unknown potential of the units in this class should be carefully considered when developing any mitigation or management actions.

Management concern for paleontological resources is moderate or cannot be determined from existing data. Surface-disturbing activities may require field assessment to determine appropriate course of action.

Class 4 – **High**. This classification is characterized by geologic units that contain a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface disturbing activities may adversely affect paleontological resources in many cases. When considering disturbance of Class 4 units, the following should be noted:

- management concern for paleontological resources in Class 4 is moderate to high, depending on the proposed action;
- a field survey by a qualified paleontologist is often needed to assess local conditions;
- management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered; and
- Class 4 and Class 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geologic mapping at an appropriate scale is not available. Resource assessment, mitigation, and other management considerations are similar at this level of analysis, and impacts and alternatives can be addressed at a level appropriate to the application. The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the surface disturbing action will usually be necessary. On-site monitoring or spot-checking may be necessary during construction activities.

Class 4a – The fossilifeous unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from surface disturbing actions. Illegal collecting activities may impact some areas.

Class 4b – These are areas underlain by geologic units with high potential but have a reduced risk of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The moderating circumstances include:

- the bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity;
- extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted;
- areas of exposed outcrop are smaller than two contiguous acres;
- outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions; and
- other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

Class 5 – **Very High**. This classification is characterized by highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.

The probability for impacting significant fossils is high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. On-the-ground surveys prior to authorizing any surface disturbing activities will usually be necessary. On-site monitoring may be necessary during construction activities. Management concern for paleontological resources in Class 5 areas is high to very high. A field survey by a qualified paleontologist is usually necessary prior to surface disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions. Official designation of areas of avoidance, special interest, and concern may be appropriate.

Class 5a – The fossilifeous unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface disturbing actions. The unit is frequently the focus of illegal collecting activities.

Class 5b – These are areas underlain by geologic units with very high potential but have a reduced risk of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

The moderating conditions include:

- the bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.
- extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
- areas of exposed outcrop are smaller than two contiguous acres.
- outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
- other characteristics are present that lower the vulnerability of both known and unidentified paleontological 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 the Natural History Museum of Los Angeles County (McCleod, 2007). Site-specific information generated by the owner of the approved BSPP project as well as the owner of the Modified BSPP was also reviewed (SWCA 2009).

Review of previous paleontological research conducted in the Modified BSPP site vicinity showed that the region is poorly understood. Very few comprehensive studies have taken place, and few finds have been reported to local museums. The information reviewed indicates there are no recorded fossil collection sites within the proposed project boundaries or within a one-mile radius.

However, there has been a recent influx of paleontological information collected in association with the large energy projects proposed and under construction in the Chuckwalla Valley and the Palo Verde Mesa. Originally, the low number of finds in the project vicinity was interpreted as an indication of low sensitivity. However, paleontological field survey and construction monitoring associated with these large projects in the last decade have consistently identified significant paleontological resources in both surface and buried contexts. For example, during construction of the Genesis Solar Energy Project, paleontological monitors have found multiple vertebrate fossils, primarily tortoise carapace and bones (BLM 2012).

Initial studies conducted for the nearby Desert Sunlight Project originally deemed the site to be of low probability for encountering vertebrate fossils (low sensitivity). However since the recent breaking of ground, several specimens (identifiable fragments or individual bones) and numerous unidentifiable fragments have been found. The identifiable species include Smilodon (carpels, metacarpels, and distal end of ulna), a phalange of an undetermined cervidae sp., a camilid, tortoise, and several partials of small mammals and rodentia. The results of these recent studies suggest that the Chuckwalla Valley is more paleontologically sensitive than originally believed (BLM 2012).

Multiple studies have identified paleosols (old soil horizons) within the Quaternary alluvium of the region. These horizons formed slowly through mechanical and chemical erosion during wetter periods in the Late Pleistocene of the Colorado Desert. These conditions are very favorable for the preservation of fossils, especially short-lived species such as rodents. These paleosols have been identified below desert pavement in the southern Chuckwalla Valley, south of Interstate 10 near State Route 177 (BLM 2012), and at the Rio Mesa Solar Energy Generating Facility (Rio Mesa). In the paleontological assessment of the proposed Rio Mesa project it was found that at least two paleosols occur between six and seven feet below the modern ground surface of the Palo Verde Mesa (Stewart 2012).

The western boundary of the Modified BSPP site surface is dominated by older alluvium derived as coarse fan deposits from the exposured metamorphic rocks in the McCoy Mountains to the west. These coarse fan deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers (McLeod 2009) and are assigned a low paleontologic sensitivity. The center portion of Modified BSPP site is surfaced by young to older alluvium and Holocene age modern washes. Shallow excavations in the Holocene age modern washes and young alluvium at the surface are unlikely to encounter significant vertebrate fossil remains; however, deeper excavations that extend into older alluvium deposits may uncover significant vertebrate fossils (McLeod 2009). Therefore, the paleontologic sensitivity in the center portion of the site where younger alluvium and modern washes are mapped varies from low in shallow excavations to high in deeper excavations. The older alluvium mapped at the surface in the central portion of the site is considered to have potentially significant fossil remains and is assigned a high paleontologic sensitivity (Solar Millennium 2009a). Older alluvial deposits of the McCoy Wash area are mapped at the surface in the northeastern and the southern portions of the Modified BSPP site. These broad hill areas are likely to contain significant vertebrate fossil remains and therefore are assigned a high paleontologic sensitivity. The alluvial deposits of the Palo Verde Mesa are mapped at the surface in a small area in the eastern boundary portion of Modified BSPP site. This older alluvium in the lower portions of the Palo Verde Mesa is likely to contain significant fossil remains and is also assigned a high paleontologic sensitivity. The McCoy Mountains formation that is mapped in the southeastern corner portion of the Modified BSPP site is unlikely to contain any significant vertebrate fossils and is assigned a low paleontologic sensitivity (Solar Millennium 2009a).

The results of a site-specific comprehensive field survey recorded a total of 37 non-significant fossil occurrences yielding petrified wood and 64 non-significant fossil points yielding non-diagnostic vertebrate material within the eastern portion of the Modified BSPP site (SWCA 2009). However, none of these localities are considered scientifically significant due to the lack of diagnostic characteristics. The closest recorded significant fossil specimen was a pocket mouse, *Perognathus*, which was recovered in the southwestern portion of Ford Dry Lake, just south and due west of the southern-most portion of the project area north of I-10 (McLeod 2009). The next closest recorded vertebrate localities in older Quaternary deposits are located in the Pinto formation about 35 miles west to northwest of Modified BSPP site between Eagle Mountains and the Coxcomb Mountains. These localities have produced fossil specimens of tortoise, *Gopherus*, horse, *Equus*, and camel, *Camelops* and *Tanupolama stevensi* (McLeod 2009). Numerous vertebrate localities have been reported in same or similar geologic units to the alluvial deposits of the Palo Verde Mesa elsewhere in the eastern Mojave Desert, in Arizona, and in Sonora, Mexico to yield scientifically significant fossil remains of *Mammuthus* (Solar Millennium 2009a).

It is important to note that the records searches conducted for the Rio Mesa Solar project (approximately 12 miles south-southwest of MBSPP), indicated no vertebrate fossils had been recorded from the project area (URS 2012). Yet, in 2011 and 2012, 834 vertebrate fossils were discovered, collected and identified at the former Rio Mesa Solar project site (URS 2012).These fossils document a previously unknown paleocommunity that existed on the Palo Verde Mesa approximately 14,000 years ago. The reported fauna consist of an anuran, numerous specimens assigned to a species of *Gopherus*, lizards, snakes, a bird, four rodent species, two carnivorans, two rabbit species, a horse, a pronghorn, a bighorn sheep, a cervid, and a proboscidean (mammoth) (URS 2012).

The significance of this collection of fossils must be viewed in the context that their existence was previously unknown. The collection includes the first intact fossil tortoise eggs ever collected in California, and the first sidewinder, desert horned lizard, and desert kangaroo rat fossils ever found in Riverside County. The collected fossils are currently being curated at the San Bernardino County Museum.

In addition to readily observable macro vertebrate fossils, many of the specimens in the collection are microvertebrates, Screening of sediments by URS on the nearby Rio Mesa Solar site produced abundant, largely burrowing, microvertebrate fossils.

The fossils were discovered in Pleistocene paleosols (ancient soil) formed on terrace surfaces on the west side of the Colorado River, Pleistocene paleosols producing vertebrate fossils are quite rare in California. Based on the location and geologic similarity, it is very likely that similar sediments underlie Modified BSPP.

As stated in the AFC, the RSA and the Petition to Amend, the site has been described in accordance with SVP criteria as containing High Sensitivity paleontological resources (Solar Millennium 2009a, CEC 2010b, PSH 2012).Based on the descriptions listed in the PFYC system shown above, staff has classified the site as belonging to PFYC Class 4, (High), which is characterized as geologic units that contain a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Staff believes that Class 4 is appropriate because all previous paleontological descriptions of the site indicate near surface soils have high paleontological sensitivity, numerous significant vertebrate fossils have been discovered in recent, large scale developments near the project site (Desert Harvest, Desert Sunlight, Genesis Solar, Rio Mesa Solar) and the site is underlain by sediments similar in nature to the sediments that under lie those projects.

Since the depth to Pleistocene age sediments beneath Holocene deposits in the central portion of the site is unknown, staff concludes that all sediments beneath disturbed ground should initially be treated as highly sensitive. After monitoring of grading and trenching activities during construction at the site, the project paleontologic resource specialist (PRS) 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 paleontologic resources.

These conclusions are based on SVP criteria, the Paleontologic Resource Assessments in the AFC (BSPP 2009), the independent records searches and paleontologic review provided by McLeod (2009) and staff's designation based on the PFYC system. Proposed Conditions of Certification **PAL-1** to **PAL-8** are designed to mitigate paleontologic resource impacts, resulting from conventional excavation operations, 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. Where significant resources are identified mitigation would be in place to ensure proper collection and curation for scientific analysis and public use, if necessary.

In areas where PV panels are to be supported by posts, adverse impacts to paleontological resources are likely to occur. In order to adequately mitigate for the potential impacts to paleontological resources in the subsurface soils where PV panel posts are proposed, a subsurface paleontological characterization must be performed in accordance with Condition of Certification **PAL-9**. The characterization will allow for the refinement of various mitigation options including fossil recovery and data collection, avoidance, and modifications of post insertion to be implemented as appropriate to ensure significant impacts are mitigated.

Construction Impacts and Mitigation

The design-level geotechnical evaluation, required for the project by the CBC (2010) and proposed Condition of Certification **GEO-1** should provide standard engineering design recommendations for mitigation of earthquake ground shaking and excessive settlement due to dynamic compaction and hydrocompaction. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2010 CBC takes effect in January 2014, the 2010 CBC provisions shall be replaced with the updated provisions.

Construction of the proposed project would directly remove approximately 4,070 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 Palo Verde Mesa and Palo Verde 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 4,070-acre area from potential production is not expected to have any significant impact on potential future development. As a result, the Modified BSPP project 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 offsite 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 near the Modified BSPP 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 appropriate Federal and Riverside County land use regulations. Therefore, the Modified BSPP project 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. Existing studies indicate the soils beneath the solar field are likely to contain Pleistocene age vertebrate fossils. Construction of the proposed project will include grading, foundation excavation, utility trenching, post insertion 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. 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 post insertion or drilled shaft foundations. Conditions of Certification **PAL-1** to **PAL-8** are designed to mitigate any paleontologic resource impacts, as discussed above, to a less than significant level in areas where conventional excavation operations occur. These Conditions of Certification essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (paleontologic resource specialist [PRS]). The conditions would also require collection and curation of scientifically significant resources for later study and public information.

In areas where PV panels are to be supported by posts, adverse impacts to paleontological resources are likely to occur. In order to adequately mitigate for the potential impacts to paleontological resources in the subsurface soils where PV panel posts are proposed, a subsurface paleontological characterization must be performed in accordance with Condition of Certification **PAL-9**. The characterization will allow for the refinement of various mitigation options including fossil recovery and data collection, avoidance, and modifications of post insertion to be implemented as appropriate to ensure significant impacts are mitigated.

With implementation of **PAL-9**, and if the CPM determines significant paleontological resources are statistically significant at the site, the project owner will be required to implement one of the following mitigation measures:

A. Provide an assessment of how avoidance of the sensitive geologic units containing significant paleontological resources may be accomplished so impacts can be minimized.

B. Where avoidance cannot be achieved in all or part of the solar field the Project Owner shall provide an assessment of alternative foundations design and construction methods that may be used in the areas where significant paleontological resources are identified.

C. Where avoidance and alternative foundation design and construction cannot be accomplished the project owner shall conduct additional excavation and collection of paleontological resources for curation such that the collection adequately assesses the scientific significance of the site and preserves a cross-section of material that can be used for future analysis and the benefit of public appreciation.

If the results of the subsurface paleontological characterization show that there are no or limited significant paleontological resources in the solar field where posts will be inserted, the CPM may find that monitoring and mitigation in accordance with Condition of Certification **PAL-1** through **PAL-8** are adequate to ensure no significant impacts would occur.

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 project owner, to produce a monitoring and mitigation plan, conduct the worker training, and oversee the monitoring.

During the excavation 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 BSPP 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 BSPP, the project owner has proposed monitoring and mitigation measures to be followed during the excavation stage of project construction. Staff believes 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.

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 disturbances 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

Non-Operation and Facility Closure Impacts and Mitigation

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.

CUMULATIVE IMPACTS

The Executive Summary section provides detailed information on the potential cumulative solar and other development projects in the project area. Together, these existing, proposed and potential projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed project. In summary, these projects are:

- Existing projects on BLM, State, and private lands, as shown on **Executive Summary Figure 1** and in **Executive Summary Table 1.**Forseeable renewable energy projects on BLM, State, and private lands, as shown on **Executive Summary Figure 1** and in **Executive Summary Tables 2 and 3**. 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.

- Projects submitted and on-hold as shown on **Executive Summary Figure 1**, and **Executive Summary Table- 4** presents Projects submitted but that are on hold.

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 the **Executive Summary** have not yet completed the required environmental processes, they were considered in this cumulative impacts analyses..

GEOGRAPHIC SCOPE OF ANALYSIS

The geographic area considered for cumulative impacts to geologic, mineralogic, and paleontologic resources would be generally limited to the Modified BSPP site. Potential cumulative effects, as they pertain to geologic hazards, are essentially limited to regional subsidence due to ground water withdrawal in the Palo Verde Valley ground water basin. 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.

EFFECTS OF PAST AND PRESENT PROJECTS

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. During operation, the proposed Modified BSPP project would consume approximately 49 ac-ft/yr which is not expected to significantly affect regional subsidence in the geographic area. Additional groundwater information is contained in the **Soil and Water Resources** section.

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 conventional excavation construction activities will be mitigated as required by proposed Conditions of Certification **PAL-1** through **PAL-8**. 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. The potential impacts to paleontologic resources in areas where PV panel posts are proposed for insertion will be mitigated as required by Condition of Certification **PAL-9**. Similar to recovery of fossils in the course of conventional site construction, this characterization effort would yield recovery of fossils representative of those that would be damaged from post insertion.

EFFECTS OF REASONABLY FORESEEABLE FUTURE PROJECTS

Foreseeable Projects in the Project Area

Several future foreseeable projects identified in **Executive Summary Tables 2 and 3** are located within the Palo Verde Valley ground water basin. Such projects would most likely include ground water pumping of similar magnitude to the Modified BSPP; 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 Palo Verde Valley ground water basin. Additional information on ground water withdrawal is contained in the **Soil and Water Resources Section**.

Foreseeable Renewable Projects in the California Desert

Several future foreseeable renewable projects in the California Desert, as shown in **Executive Summary Tables 2 and 3**, would be located within the Palo Verde Valley ground water basin. Such projects would most likely include ground water pumping of similar magnitude to the Modified BSPP; 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**.

Contribution of the Blythe Solar Power Project to Cumulative Impacts

Construction

The construction of the Modified BSPP 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 Modified BSPP would not impact any reasonably foreseeable development of sand and gravel resources.

The construction of the Modified BSPP would include excavation and grading at the site. Proper monitoring of excavations at the proposed Modified BSPP 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. However, in areas where PV panel posts are proposed, any undiscovered fossils would be destroyed without the opportunity of discovery, recovery and analysis of these finite nonrenewable resources.

Conversely, where PV panel posts are inserted into soils with high paleontological sensitivity, fossils will be destroyed with no opportunity for discovery or recovery.

Under the site's current classification of paleontological sensitivity, it must be concluded that significant adverse impacts to paleontological resources would result from the proposed method of post insertion. Similar to recovery of fossils in the course of conventional site construction, implementation of Condition of Certification **PAL-9** would yield recovery of fossils representative of those that would be damaged from post insertion.

Operation

The operation of the Modified BSPP is expected to result in increased annual ground water pumping, from the current 2,000 ac-ft/yr to approximately 2,600 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 Modified BSPP would only contribute a minor amount of additional ground water withdrawal to the overall amount in the Palo Verde ground water basin and since this cumulative amount is only a fraction of historic pumping levels that did not result in any documented subsidence, operation of the Modified BSPP is not expected to impact regional subsidence in the Palo Verde ground water basin.

Operation of the Modified BSPP is not expected to require any significant excavation or grading such that cumulative impacts to geologic, mineralogic, and paleontologic resources are not expected.

Non Operation and Facility Closure

Non Operation and facility closure of the Modified BSPP 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.

Closure of the Modified BSPP would include excavation and grading at the site. Proper monitoring of excavations at the proposed Modified BSPP 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 Modified BSPP 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.

COMPLIANCE WITH LORS

Federal, state, or local/county laws, ordinances, regulations, and standards applicable to the proposed project were detailed in **Geology and Paleontology Table 1**. Staff anticipates that the project would be able to comply with most applicable LORS. However, as proposed, the project would not comply with "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures" as developed by the Society of Vertebrate Paleontologists. These Measures paraphrase Section 6302 of the Paleontological Resources

Preservation Act (PRPA) which mandates that federal agencies "*shall manage and protect paleontological resources on Federal land using scientific principles and expertise.*" In addition, as proposed, the project would not comply with Bureau of Land Management (BLM) Instructional Memorandum 2008-009 which requires the Potential Fossil Yield Classification (PFYC) system to be used to classify paleontological resource potential on public lands in order to assess possible resource impacts and mitigation needs for Federal actions involving surface disturbance, land tenure adjustments, and land-use planning. Memorandum 2008-009 also provides up-to-date methodologies for assessing paleontological sensitivity and management guidelines for paleontological resources on lands managed by the Bureau of Land Management

NOTEWORTHY PUBLIC BENEFITS

The science of paleontology is advanced by the discovery, study and duration 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 Modified BSPP facility, in accordance with an approved Paleontologic Monitoring and Mitigation Plan, 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. In addition, subsurface paleontological characterization of site soils could also yield beneficial information and become the basis of significance determination of adverse impact in areas penetrated by PV panel support posts.

RESPONSE TO COMMENTS

No comments have been received pertaining to Geology or Paleontology.

CONCLUSIONS

Based on its independent research and review, Energy Commission staff believes that the potential is low for significant adverse impacts to the proposed project from geologic hazards during its design life and to potential geologic and mineralogic, resources from the construction, operation, and closure of the proposed project.

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 MBSPP should not have a significant impact on the availability of such resources. There are no other known viable geologic or mineralogic resources at the MBSPP site.

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-8** in areas where soils are exposed by conventional excavation operations.

The project owner would comply with applicable LORS, provided that the existing Conditions of Certification are implemented and followed. The design and construction of the project, as amended, should have no adverse impact with respect to geologic hazards, or geologic and mineralogic, resources.

Regarding panel post insertion, with implementation of **PAL-9**, and if the CPM determines significant paleontological resources are statistically significant at the site, the project owner may be required to implement one of the following mitigation measures:

A. Provide an assessment of how avoidance of the sensitive geologic units containing significant paleontological resources may be accomplished so impacts can be minimized.

B. Where avoidance cannot be achieved in all or part of the solar field the Project Owner shall provide an assessment of alternative foundations design and construction methods that may be used in the areas where significant paleontological resources are identified.

C. Where avoidance and alternative foundation design and construction cannot be accomplished the project owner shall conduct additional excavation and collection of paleontological resources for curation such that the collection adequately assesses the scientific significance of the site and preserves a cross-section of material that can be used for future analysis and the benefit of public appreciation.

If the results of the subsurface paleontological characterization show that there are no or limited significant paleontological resources in the solar field where PV panel posts will be inserted, the CPM may find that monitoring and mitigation in accordance with Condition of Certification **PAL-1** through **PAL-8** are adequate to ensure no significant impacts would occur.

Staff proposes to ensure compliance with LORS through the adoption of the conditions of certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

The proposed Modified BSPP is situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by the CBC (2010). Settlement due to hydrocompaction or dynamic compaction, and corrosive soils, must be mitigated in accordance with a design-level geotechnical investigation as required by the CBC (2010), 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-8**

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 180~~2A~~**3** of the 20~~07~~**10** CBC should specifically include laboratory test data, associated geotechnical engineering analyses, and a thorough discussion of corrosive soils, hydrocompaction or dynamic compaction; and the presence of expansive clay 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 CPM with the resume and qualifications of its PRS for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontologic Resources Report, the project owner shall obtain CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified paleontologic 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 paleontologic 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 geologic and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and
5. At least three years of paleontologic resource mitigation and field experience in California and at least one year of experience leading paleontologic resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontologic 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 paleontologic 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 paleontologic resources monitoring and mitigation plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontologic 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 paleontologic 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 paleontologic 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 paleontologic 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 paleontologic 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 paleontologic 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 paleontologic 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 paleontologic resource activities. The PRS may informally discuss

paleontologic 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 paleontologic 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 paleontologic 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 paleontologic find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontologic 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 paleontologic 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 paleontologic 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 paleontologic 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 paleontologic 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 Paleontologic 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 **be** limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontologic resources encountered; determinations of sensitivity and significance; and **the PRS' description of sensitivity and significance of those resources**~~**a statement by the PRS that project impacts to paleontologic 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.

PAL-8 **The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed, including collection of fossil material, preparation of fossil material for analysis, analysis of fossils, identification and inventory of fossils, preparation of fossils for curation, and delivery for curation of all significant paleontological resource materials encountered and collected during project construction. The project owner shall pay all curation fees charged by the museum for fossil material collected and curated as a result of paleontological mitigation. The project owner shall also provide the curator with documentation showing the project owner irrevocably and unconditionally donates, gives, and assigns permanent, absolute, and unconditional ownership of the fossil material.**

Verification: **Within 60 days after the submittal of the PRR, the project owner shall submit documentation to the CPM showing fees have been paid for curation and the owner relinquishes control and ownership of all fossil material.**

PAL-9 **The project owner shall prepare a paleontological characterization plan suitable to adequately assess the paleontological resources of the subsurface in the mirrored solar field area. The plan shall be provided to the compliance project manager (CPM) for review and approval. Following CPM approval of the plan, the project owner shall conduct the paleontological resources characterization of the subsurface in the solar field area. The characterization shall be conducted in accordance with the Bureau of Land Management (BLM) "Guidelines for Assessment and Mitigation of Potential Impacts to Paleontological Resources". The characterization shall include subsurface excavations within the proposed solar field to a depth equal to the maximum depth of panel post insertion. All excavations shall be logged and sampled by a qualified paleontologist under the direct supervision of the paleontological resource specialist (PRS). The number of excavations shall be statistically significant determined in accordance with current statistical procedures similar to those presented in *Information***

***Technology, Learning, and Performance Journal, Vol. 19, No. 1, Spring 2001*. Following completion of the field work, the project owner shall document the findings and interpretations in a paleontological characterization report. The paleontological characterization report shall contain:**

1. **Date(s) of the fieldwork and names of any personnel assisting with the fieldwork.**
2. **Brief description of project and expected impacts to paleontological resources.**
3. **A description of field methods used.**
4. **A summary of findings, including important discoveries.**
5. **A discussion of the significance of the findings/discoveries.**
6. **A description of potentially fossiliferous areas to allow for future assessment of sites, even if no fossils were located during the project monitoring.**
7. **A completed BLM locality form 8270-3 or equivalent for each new locality, using Universal Transverse Mercator (UTM) NAD 83 coordinates, and 1:24000 scale maps with new localities plotted using points or polygons as appropriate.**
8. **Locality forms, maps, and any other information containing specific fossil locations will be bound separately or assembled as a separate section to allow for preservation of confidential locality data.**
9. **List of specimen field numbers and field identifications of collected material, cross-referenced to the locality field number. This list may be submitted in electronic format, preferably in a spreadsheet format.**
10. **A summary of regional and local geology; this will reference earlier projects for relevant information.**
11. **A summary of regional and local paleontology; this will reference earlier projects for relevant information.**
12. **Potential impacts to paleontological resources resulting from the project.**
13. **Map of project area, indicating areas surveyed, known localities, and new discoveries.**
14. **Relevant photos, diagrams, tables to aid in explaining, clarifying, or understanding the findings.**

If the CPM determines significant paleontological resources are statistically significant at the site the project owner will be required to implement one of the following:

A. **Provide an assessment of how avoidance of the sensitive geologic units containing significant paleontological resources may be accomplished so impacts can be minimized. The CPM shall review and approve the assessment prior to implementation.**

B. **Where avoidance cannot be achieved in all or part of the solar field the Project Owner shall provide an assessment of alternative foundations design and construction methods that may be used in the areas where significant paleontological resources are identified. The CPM shall review and approve the assessment prior to implementation.**

C. **Where avoidance and alternative foundation design and construction cannot be accomplished the project owner shall conduct additional excavation and collection of paleontological resources for curation such that the collection adequately assesses the scientific significance of the site and preserves a cross-section of material that can be used for future analysis and the benefit of public appreciation.**

If the results of the study show that there are no or limited significant paleontological resources in the solar field where PV panel posts will be inserted the CPM may find that monitoring and mitigation in accordance with Condition of Certification PAL-1 through PAL-8 are adequate to ensure no significant impacts.

Verification:

1) **At least 90 days prior to the start of ground disturbance, the project owner shall submit the paleontological characterization plan to the CPM for review and approval.**

2) **At least 30 days prior to ground disturbance, the project owner shall initiate field work in the areas where ground disturbance will first be conducted. The field work shall proceed sequentially in areas scheduled for panel foundation installation and shall precede panel foundation installation by a period of not less than 7 days.**

3) **At least 30 days prior to ground disturbance, the project owner shall provide a panel foundation construction schedule to the CPM.**

4) **No more that 90 days after completion of panel foundation construction, the project owner shall provide the CPM a draft paleontological characterization report for review and comment.**

5) **The findings of the solar field paleontological characterization shall be incorporated into the PRR required in PAL -7, above.**

Certification of Completion
Worker Environmental Awareness Program
Blythe Solar Power Project (09-AFC-6)

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, paleontologic, 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.

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Cultural Trainer: ______________ Signature:___________________ Date: ___/___/____

PaleoTrainer: _______________ Signature:___________________ Date: ___/___/____

Biological Trainer: ______________Signature:________________ Date:___/___/__

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POWER PLANT EFFICIENCY

Testimony of Edward Brady

SUMMARY OF CONCLUSIONS

The modified Blythe Solar Power Project (BSPP) would use photovoltaic (PV) panels to generate electric power. Staff estimates that BSPP would produce electric energy within a range of 1,052 to 1,450 gigawatt hours (GWh) annually, depending on the mix of fixed and tracking PV panels.

BSPP would occupy approximately 8.4 acres per megawatt (MW) of power output, or inversely, generate 0.12 MW per acre. These ratios are comparable to other solar technologies. The replacement of solar PV technology for the parabolic trough (PT) technology that was previously approved for this project would eliminate the impacts related to the depletion of fossil fuel resources because, unlike the approved project, the modified project would not use substantial quantities of fossil fuel. (Fossil fuel use would be limited to the mirror washing machinery, maintenance equipment, emergency generators, and fire pump engines. None of these uses would generate electricity for delivery to the electric power grid.) The land use efficiency, however, would decrease from 0.17 MW per acre to 0.12 MW per acre (see **Efficiency Table 1**).

The project would decrease reliance on fossil fuel by utilizing direct incident radiation (DIR) from the sun, a renewable energy resource. No formal efficiency standards apply to this project, except to compare the land use efficiency to other solar projects under consideration by the California Energy Commission (Energy Commission). Staff therefore concludes that this project would present no significant adverse impacts on fossil fuel energy resources.

INTRODUCTION

The modified BSPP would generate 485 MW (nominal output) of electricity. The modified project would be a solar PV facility that would be located on a 4070-acre site in Riverside County, California; this area would be confined within the larger previously approved site for the approved BSPP project (BSPP 2012a, Revised Petition to Amend, Figure 2-3). The project would use flat-panel PV cells to generate direct current (DC) electric energy, combining groupings of panels with a single induction unit to covert the DC power into alternating current (AC) power suitable for connecting to the electric power grid.

BSPP proposes to install fixed angle or single-axis tracking flat plat PV panels or a mixture of both. The fixed angle flat plate PV cells would be installed along a north-south axis, tilted at a south-facing angle of declination. Tracking panels would rotate around the north-south axis of rotation, following the sun’s path from east to west. The panels would be mounted on pylons spaced in a 10-foot by 10-foot grid array, suspended on a pylon five to six feet above ground and positioned to minimize field interference such as the projection of shadows from adjacent panels. When shadows occur, the single-axis tracking panels would rotate to a default horizontal position.

METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

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 consumption of energy, in the form of nonrenewable 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;
- non-compliance with existing energy standards; or
- wasteful, inefficient, and unnecessary consumption of fuel or energy.

The discussions under **Fossil Fuel Use Efficiency** and **Solar Land Use Efficiency** below describe the CEQA level of significance as related to power plant efficiency.

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 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 power plant's energy consumption would create a significant adverse impact, it must further determine if feasible mitigation measures could eliminate or minimize that impact, and if so, require that those measures be implemented. In this analysis, staff addresses the inefficient and unnecessary consumption of energy for BSPP.

In order to develop the Energy Commission's findings, this analysis:

- examines whether the facility would likely present any adverse impacts upon energy resources;
- examines whether these adverse impacts would be significant; and if so,

- examines whether feasible mitigation measures or alternatives could eliminate those adverse impacts or reduce them to less than significant.

Unlike solar thermal plants, solar PV facilities do not require fossil fuel back-up, typically natural gas and propane, to provide nighttime freeze protection and assist with morning start-up. Fossil fuel, typically diesel, would still be required for incidental uses such as emergency power for fire protection, panel washing, and telecommunications, but the impact on the fuel supply for delivery to existing and future facilities not associated with this project would be negligible.

Where supplementary fuels provide a method for bridging inclement weather conditions (storm clouds, dust storms, wind) for solar thermal technologies, the solar PV system has no similar back-up system integral to the solar power generation (see **Efficiency Appendix A** below). As a result, solar PV systems have to rely on other power plants readily dispatched onto the grid and capable of employing quick response ramping up and down (see **Efficiency Appendix A** below).

Solar Land Use Efficiency

The greatest impact of a renewable power project that uses solar energy would be the expanse of land required to collect enough direct incident radiation (DIR) from the sun to meet the design electric power output. The solar land use efficiency or land utilization has come into general use as the common denominator for comparing one solar system to another. This method has been refined into two categories: Power-based and energy-based solar land use efficiency.

Power based efficiency is the ratio of the designed electric power output by the amount of acreage (MW /acre) and its reciprocal (acres/MW). This land area includes the total area of the solar fields and permanent common facilities, but excludes utility rights-of-way, transmission corridors, construction laydown area, temporary buildings, and land set aside for biological mitigation. Energy-based efficiency is the ratio of annual electrical energy production and land area. The power-based metric reflects the idealized design condition, used principally to compare one solar project to another. The energy-based measurement indicates the operating performance and is used to compare the operation of a particular solar project from one year to another as well as to compare the energy-based operation of one solar project to another.

The PV system configuration

Solar PV power is characterized by the following:

- PV cells convert solar radiation directly into electric current. Photons of light excite electrons on the surface of a PV cell to a higher energy state, providing the potential to induce current.
- DC (direct current) from the PV cells gets adjusted in an inverter, converting DC to AC (alternating current) suitable for transmission via the electrical power grid.

- PV systems can be switched off and on instantaneously and don't require ramping in order to bring a plant online or take it offline. But because they switch off and on instantaneously by cloud cover or by other interference to solar radiation, they have limited ancillary service.[1]

PV systems are typically designed according to the following:

Efficiency. The commercially available conversion efficiency of DIR (direct incident radiation) to PV current, is currently between 6 and 16 percent.

Heirarchy. The manufactured solar *panels* are aggregated into a *module* comprised of 60 to 90 panels. Modules are combined into 2 MW *blocks* called Power Control Stations (PCS). These PCS's or blocks combine to a single *unit.*

Power Conversion. Each PCS has an inverter, which converts direct current to alternating current and an intermediate transformer, which boosts voltage from 265 volts to 34.5 kV (kilo-Volts).These blocks comprise a unit, combining to a single step-up transformer (SUT). The SUT raises voltage from 34.5 kV to 230 kV, suitable for connection to the transmission grid.

Distributive Structure. The PV construction hierarchy of panel-module-block-unit is designed to minimize voltage losses and maximize the benefits of distributive induction components.

Array Configuration. PV panels are configured to avoid the projection of shade or field interference on other PV panels, which would cause an interruption of power generation of other PV panels in the same PCS. Where fixed tilt would be most common, single axis tracking arrays would be used to improve the collector performance in locations where there would be a high degree of interference.

[1] Even in the best of circumstances, the electricity grid will experience short-term, temporary changes in overall capacity. Utilities and grid operators must be prepared to account for a power plant or transmission line that unexpectedly goes out of service or for unforeseen increases or decreases in the electric demand. In addition, as utilities and grid operators increase their reliance on intermittent renewable generation capacity like wind and solar power, additional balancing resources are required to address any inconsistencies in generation, for example when sufficient wind and sun are not available. Ancillary services products address these short-term imbalances in electricity markets by dispatching resources within seconds or minutes of an unacceptable imbalance. The United States Federal Energy Regulatory Commission, or FERC identifies six different kinds of ancillary services:

- scheduling and dispatch
- reactive power and voltage control
- loss compensation
- load following
- system protection
- energy imbalance

PROPOSED MODIFIED PROJECT

The modified BSPP includes replacing the solar thermal technology with the PV technology and reducing the physical size of the project.

The applicant proposes to build and operate BSPP, a solar power plant producing a total capacity of 485 MW (nominal net output), employing the solar PV flat panel technology. The applicant estimates that BSPP would employ more than 6 million flat-plate PV panels (BSPP 2013a, Revised Petition to Amend, § 2.1.2, Table 2.2, 600 mm x 1200 mm, CdTe) aggregated into 250 two-megawatt inverter blocks. BSPP would deploy fixed-tilt or single-axis tracking arrays or a mixture of both, factoring in the effects of topography and other types of field interference.

Power plant efficiency impacts from the modified project are expected to be similar to the approved project (see analysis below). BSPP would occupy approximately 8.4 acres per megawatt (MW) of power output, or inversely, generate 0.12 MW per acre. These ratios are comparable to other solar technologies. The replacement of solar PV technology for the parabolic trough (PT) technology which was previously approved for this project would eliminate the impacts related to the depletion of fossil fuel resources because unlike the approved project, the modified project would not use substantial quantities of fossil fuel. (Fossil fuel use would be limited to the mirror washing machinery, maintenance equipment, emergency generators, and fire pump engines. None of these uses would generate electricity for delivery to the electric power grid.) The land use efficiency, however, would decrease from 0.17 MW per acre to 0.12 MW per acre (see **Efficiency Table 1**).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

BSPP would not consume any fossil fuel for power generation. (See **Adverse Effects on Energy Supplies and Resources below.**) However, since PV is unable to provide any ramping capability during natural events such as cloud cover and wind storms, quick response back-up of electric power generation using the most available and plentiful source of non-renewable fuel (i.e.; natural gas) would be necessary. The power industry is currently taking on the challenge to address this technological issue.[2] **Appendix A** below provides a sample of natural gas power generation systems and their attendant efficiencies. Under the circumstances, staff considers the impact of the project's fuel consumption on energy supplies and energy efficiency to be less than significant because the natural gas consumption involved in this Solar PV/NGCC (natural gas combined cycle) pairing would be insignificant compared to the natural gas source and delivery infrastructure already in existence.

[2] See "Gas Turbine Combined Cycle Fast Start: The Physics Behind the Concept" by S. C Gulen, Bechtel, Principal Engineer, Power Engineering, June 2013.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The natural gas transmission system to which BSPP would indirectly rely (i.e.; the gas transmission system feeding NGCCs in California) provides access to production areas in the Permian Basin of west Texas and the San Juan Basin of southern Colorado. The effect of the impact of natural gas consumption on the supply and distribution system would have already been factored into the environmental impact of each individual power generation system. Therefore, staff considers the impact of this project on the existing fossil fuel supply as insignificant.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

There would be no likelihood that BSPP would require the development of additional energy supply capacity.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of BSPP 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

For purposes of this analysis, natural gas, oil, coal, nuclear, geothermal, biomass, hydroelectric, wind and solar photovoltaic technologies are all considered. This project would indirectly cause the consumption of fossil fuel in order to countervail potential intermittencies during cloud cover or wind storms. But fuel availability would already be factored into the potential impact of systems paired with BSPP to address the intermittency issues. Therefore, staff believes that the BSPP project would not constitute a significant adverse impact on fossil fuel energy resources compared to feasible alternatives.

The solar insolation radiating on the earth's surface can be regarded as a virtually limitless energy resource. Since this energy is inexhaustible, its consumption does not present the concerns inherent with fossil fuel consumption. What is of concern, however, is the 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 industry standard for evaluating the efficiency of a solar power plant like BSPP. Accordingly, staff proposes to tabulate the land use efficiency of the project and compare it to similar measures for other solar power plant projects that have been submitted or approved under the Energy Commission's siting process.

Energy Commission staff proposes to compare the land use of BSPP to that of other solar projects in the Energy Commission's siting review process. No agency policymaker or industry standard-maker has determined how great a difference in land use would constitute a significant difference. Nevertheless, staff proposes to compare BSPP to ten other solar projects currently in the licensing process (see **Efficiency Table 1**). Included are BSPP's own approved configuration and one non-solar project in order to identify their respective contrasts and similarities.

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 to compare and contrast relative performance.

A solar power project that occupies more land than another project holds the potential to produce more environmental impacts. BSPP would produce power at the maximum rate of 485 MW net, and generate energy in the range of 1,052 – 1,450 GWh per year, while occupying 4,070 acres. Staff calculates power-based and energy-based land use efficiencies below:

Power-based efficiency: 485 MW ÷ 4,070 acres = **0.12 MW/acre** or **8.4 acres/MW**

Energy-based efficiency:

- 100% Fixed Tilt Panels: 1,052 GWh/year ÷ 4,070 acres = **258 MWh/acre-year**
- 50/50 Mix Panels: 1,251 GWh/year ÷ 4,070 acres = **307 MWh/acre-year**
- 100% Tracking Panels: 1,450 GWh/year ÷ 4,070 acres = **356 MWh/acre-year**

Efficiency Table 1
Solar Land Use Efficiency

Project	System Type[3]	Generating Capacity (MW net)	Annual Energy Production (GWh 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
Blythe Solar (as Modified) (09-AFC-6C)	PV	485		0	4,070	0.12		
-Fixed Angle (34º South)			1,052[4]				258	258
-50% Fixed/50% Tracking			1,251				307	307
-Single-Axis Tracking			1,450				356	356
Blythe Solar (as Approved) (09-AFC-6)	PT	1000	2,100	207,839	5,950	0.17	353	348
Beacon Solar (08-AFC-2)	PT	250	600	36,000	1,240	0.20	484	480
Ivanpah SEGS (07-AFC-5)	SPT	400	960	432,432	3,744	0.11	256	238
Palen ESGS (09-AFC-7C)	SPT	500	1,412	10,400	3,794	0.13	370	359
Hidden Hills SEGS (11-AFC-5)	SPT	500	1,412	94,907	3,097	0.16	463	460
Ridgecrest SEGS (09-AFC09	PT	250	500	7,200	1,440	0.17	347	346
AV Solar One, Antelope Valley	PV	230	592	0	1,955	0.12	303	303
Desert Sunlight, Chuckwalla	PV	550	1,190	0	3,761	0.15	316	316
Topaz Solar, Carrizo Plains	PV	550	1,096	0	3,500	0.16	313	313
California Valley, Carrizo Plains	PV	250	688	0	1,500	0.17	459	459
Avenal Energy[5]	NGCC	600	3,023	24,792,786	25	24.0	120,936	n/a

[3] PV (Photovoltaic), Parabolic Trough (PT), Solar Power Tower (SPT), Natural Gas Combined Cycle (NGCC)
[4] Estimates of annual power generation based on Weather Bureau Army Navy insolation data, WBAN No. 23161 for Daggett, CA
[5] Example of natural gas-fired combined cycle plant.

As seen in **Efficiency Table 1**, BSPP, on an energy-based efficiency basis, is comparable to various solar PV projects listed, if employing a 50/50 mix of fixed tilt and single-axis tracking panels, and is similar to various solar thermal projects listed (employing the PT and SPT technologies), if employing 100 percent single axis tracking panels.[6]

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** for Avenal NGCC. However, this would not achieve the basic project objective, i.e. to generate electricity from a renewable energy source.

Staff analyzed the range of land use efficiencies for the modified BSPP when different mixes of fixed tilt and single-axis tracking PV panels are used. The reason was to compare the area utilization of variously approved solar technologies. BSPP falls between typical power-based ratios in the range of 0.11 to 0.20 MW per acre. Using the energy-based metric, staff observed that the annual electric energy production increased as the percentage of tracking panels is increased.

PROJECT CLOSURE AND DECOMMISSIONING

Project operation would cease when the BSPP project closes. Facility closure would not present significant impacts on electric system efficiency. Upon the completion of decommissioning and restoration of the land occupied by the project, the land can then become available for other power generating uses, which may or may not exhibit a higher energy efficiency rate than BSPP, depending on the selected technology.

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 BSPP 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.

[6] Comparison of solar thermal projects taken from a sample of currently approved projects. The solar PV projects are projects used in the Hidden Hills Solar Electric Generation Systems (HHSEGS) Final Staff Analysis “Engineering Assessment of the Alternatives”,, Alternatives Tables 5 and 9.

COMPLIANCE WITH LORS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

NOTEWORTHY PUBLIC BENEFITS

BSPP would employ an advanced solar 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.

PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

No conditions of certification are proposed.

CONCLUSIONS

The modified Blythe Solar Power Project (BSPP) would use photovoltaic (PV) panels to generate electric power. Staff estimates that BSPP would produce electric energy within a range of 1,052 to 1,450 gigawatt hours (GWh) annually, depending on the mix of fixed and tracking PV panels.

BSPP would use solar energy to generate all of its capacity. The project would decrease reliance on fossil fuel, and would increase the utilization of 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. BSPP would generate approximately 0.12 MW per acre of land (or occupy approximately 8.4 acres per MW); roughly equivalent to other solar power technologies. Staff concludes that the BSPP's generating technology is comparable to land use-efficient solar technologies currently available.

REFERENCES

BSPP 2013a - Blythe Solar Power Plant (09-AFC-6C), Revised Petition to Amend.

HHSEGS 2012a – Hidden Hills Solar Electric Generation System (11-AFC-02). Final Staff Analysis, Alternatives, 12/12/12, pp. 1679-1876.

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 (or other fossil fuel types) burned for morning startup, cloudy weather augmentation and Therminol freeze protection. However, this is not applicable to a PV power plant, such as the modified BSPP project, because no fossil fuel would be used for morning startup, cloudy weather augmentation, or freeze protection.

For the purpose of comparing the land use efficiency of various solar power plants to natural gas-fueled plants, staff offers the following analysis to come up with an average energy efficiency figure for comparison. This efficiency figure is used to subtract out the energy of the natural gas portion of the solar thermal projects' thermal input to develop the solar-only energy-based land use efficiency; compare the last two columns of **Efficiency Table 1** (as explained above, this does not apply to PV plants). Staff uses the average efficiency of a representative list of combined-cycle plants of 53.7 percent (see the bottom of this appendix) for calculating out the energy of the natural gas input from the total quantities of the thermal input. As a proxy, staff has used an average efficiency based on several baseload combined cycle power plant projects that have gone through the Energy Commission's 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**

POWER PLANT RELIABILITY

Testimony of Edward Brady

SUMMARY OF CONCLUSIONS

The project owner has not assigned an availability factor that could lead to the conclusion that the photovoltaic (PV) electric power generation is a mature technology. However, adequate design and construction practices would provide an adequate level of reliability and the attendant availability to support a satisfactory level of reliability. (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 Blythe Solar Power Project (BSPP) would be built and would operate in a manner consistent with industry norms for reliable operation. No conditions of certification are proposed.

INTRODUCTION

In this analysis, California Energy Commission (Energy Commission) staff (staff) addresses the reliability issues of BSPP to determine if the power plant is likely to be built in accordance with typical industry norms for reliable power generation. Staff uses these norms as a benchmark because they ensure that the resulting project would not be likely to degrade the overall reliability of the electric system it serves.

The scope of this power plant reliability analysis covers these benchmarks:

- equipment availability and 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. Staff has used the above benchmarks as appropriate industry norms to evaluate the project’s reliability.

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 and unplanned outages subtract from this availability. 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, BSPP is expected to operate reliably (NEBS2013a, Revised Petition to Amend, § 3.1.4). 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 BSPP would be as reliable as other power plants on the electric system and would not degrade system reliability.

PROPOSED PROJECT

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. 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 project owner proposes to operate the 485-megawatt (MW) (net power output) BSPP, a PV solar facility employing current solar power technology. This project would help serve the demand for renewable energy in California, producing electricity on hot summer afternoons, when it is most needed. This project would use renewable solar energy and would provide dependable power to the grid, making it available to other utilities.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Solar PV energy functions by using the photovoltaic effect. Photons of light from the sun's radiation hit the PV panels and excite electrons in the cell strata to a higher energy state, providing the potential to induce current. Direct current (DC) from the PV panels passes through an inverter, which converts the DC power into alternating current. Depending on the type of PV media used, the conversion efficiency from the direct incident radiation (DIR) to the PV power output ranges from 10 to15 percent.

The project owner provided a description of the solar PV system it plans to deploy at BSPP. The system would be designed to provide the peak capacity of 485 MW (NEBS2013a, Revised Petition to Amend § 2.1.2). The construction is phased into two parts: Phase 1 includes Unit 1 through Unit 3 having a capacity of 125 MW each and Phase 2 would be comprised of Unit 4 with 110 MW peak output. Typical of the first three units, the PV system breaks down into sixty-three 2-MW blocks. Each block constitutes the DC termination of 60 to 90 panel modules into combiners, the inverter to convert DC into 265 VAC (volts-alternating-current), intermediate transformers to boost voltage to 34.5 kV and the step-up transformer (SUT) to boost the power up to 230 kV transmission voltage for delivery to the electric grid.

The PV field divides BSPP into the four discrete units (NEBS2013a, Revised Petition to Amend Figure 1), organizing the panels into arrays which are 3,000 feet going east to west and 16 feet wide, bounded by a 24-foot access road running east-west and directly adjacent to the Power Control Station (PCS) that is attached to each array. A 16-foot-wide access road runs north-south at the ends of each 3,000-foot panel cluster array. Each of these clusters constitutes a 10 MW aggregation of 2 MW blocks, sub-grouped into panel modules.

The project owner reserved the option to use two different types of flat-plate PV panels: Thin film cadmium telluride (CdTe) or polycrystalline cells. Because of the difference in size and efficiency of the respective PV media, the number of panels in the modules, blocks and arrays would be different. Staff estimated the number of panels in its organizational hierarchy for the purpose of comparison (see **Reliability Table 1** below).

The table is based on 100 percent single access tracking modules. The fixed panels would be oriented in a southerly direction with a tilted angle of declination from the horizontal of 30 degrees. The single axis panels would rotate along the north-south axis, following the daily travel of the sun from and easterly to westerly direction. The controls are designed to reset the single axis panels to a horizontal position if shadows are detected. If the project owner chooses to use either a mixture of fixed and tracking panels or 100 percent fixed panels, the total number and make-up of the solar PV panels, modules and blocks would necessarily be adjusted.

EQUIPMENT REDUNDANCY AND PLANT MAINTAINABILITY

The pyramid configuration of the solar PV system provides inherent redundancy. Major plant systems are designed with adequate redundancy to ensure their continued operation if equipment fails. The combination of series and parallel circuiting minimize the effect of a single panel failure or shadow projection. At the block level, combiner boxes, inverter and intermediate transformer are replicated over sixty times to reduce the impact of a fault or failure to about 2 percent (1/63) or 0.98 (1-0.016) at the inverter, the most critical component prone to breakdown or failure.[1] The inverter has a 5-10

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[1] pg. 2, Fitz, Eric, Navigant Consulting, “The Bottom Line Impact f PV Module Reliability.” renewableenergyworld.com.

year life span, which indicates that this component will be replaced 2-3 times over the 30-year plant life.[2]

Reliability Table 1 PV System Configuration
PV Cell Type Comparison (Typical of Units 1-3)

PV Cell Type	Thin Film (CdTe)			Polycrystalline Cells		
Panel Dimensions:						
Length (ft)	4.0			6.50		
(m)	1.20			1.97		
Width (ft)	2.0			3.25		
(m)	0.600			0.99		
Area (ft^2)	8.0			21.1		
(m^2)	0.72			1.95		
Electrical:						
Power (Watts)	92.5			300		
Volt-Amps (Va)	92.5			300		
Efficiency (%)	12.8			15.4		
Voltage (Pmax)	47.7			36.7		
Current (Pmax)	1.94			8.17		
Quantities (per):	Unit	Block (PCS)	Module	Unit	Block	Module
Panels [a]	1,530,000	21,120	88	478,000	6,660	60
Modules [b]	17,222	240	--	7,968	111	--
Blocks [c] (PCS) (2 MW)	63	--	--	63	--	--
Lateral [d] (~10 MW)	13	--	--	13	--	--

a. **Panels**: Manufactured flat assembly upon which PV film or cell is applied.

b. **Module:** Array of modules wired in series voltage.

c. **Block (PCS):** Nominal 2-MW assembly which terminates in a Power Control Station (PCS) where modules are wired to combiners, converted to AC current in an inverter, and boosted to 34.5 kV with an intermediate transformer.

d. **Lateral**: Designation for nominal 10 MW assemblies where blocks are combined terminated and boosted up to 230 kV transmission voltage.

The performance of the solar PV panels is the most critical performance element of the proposed system. For a typical CdTe module, the manufacturer provides a 5-year materials and workmanship warranty at 100 percent of nominal capacity, which address the level of confidence in the earliest period of plant operation. From 5-10 years, the output performance is guaranteed at a 90 percent level and from 10-25 years, performance is warranted at 80 percent of nominal capacity.[3] This degradation needs to be factored into the expected performance of the plant, especially at the declining period (25-30 years).

[2] pg. 1, Sandia Nation Laboratories: Inverter Reliability Program. http://energy.sandia.gov.

[3] Datasheet PD-5-401-03 NA OCT 2010, First Solar FS Series 3 PV Module.

In order to compensate for the effects of this degradation, the project owner would have the opportunity to repair, replace, or upgrade the panels to maintain a high level of reliability.

The same replacement guarantees and degradation factors would generally apply to polycrystalline cells.[4] In addition, the initial power output rating should be based on industry performance standards independently determined from the solar PV panel manufacturer. In the case of the solar PV panels, the appropriate Underwriters' Laboratories (UL) standards should be applied.[5]

Equipment would be purchased from qualified suppliers based on technical and commercial evaluations, installed, tested and commissioned in accordance with the designer's and supplier's guidelines and recommendations. 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**.

The project, as proposed in the Revised Petition to Amend, 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 many independent panels, modules, and blocks provides inherent reliability. The nature of solar generating technology also provides inherent redundancy; the series-parallel arrangement of panel assemblies would allow for reduced output generation if one (or possibly several) rows of solar collectors were to require service or repair (NEBS2013a, Revised Petition to Amend § 2.2.3). This redundancy would allow service or repair to be done during sunny days when the plant is in operation, if required.

Maintenance Program

Equipment manufacturers provide maintenance recommendations for their products, and the project owner would most likely base the project's maintenance program on those recommendations. Such a program would encompass both preventive and predictive maintenance. In the case where the operational life cycle for PV panels is 25-30 years and inverters are more vulnerable to failure, having only an expected 5-10 year duty cycle, maintenance outages would need to be planned to accommodate the shorter inverter operating life. Staff expects that the project would be adequately maintained to ensure an acceptable level of reliability.

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 typical power plant. The need for reliable sources of fuel and

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[4] Datasheet 9F-043 PC08-09, Sharp NA Series

[5] UL- 61215 (crystalline panels), UL-61646 (thin-film panels), UL-1703 (construction and fire resistance.)

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

The natural gas fuel requirement for the approved project is no longer required for the operation of the modified project's generation system; no natural gas (or any other form of fossil fuel) would be consumed for power generation.

Water Supply Reliability

BSPP has proposed to use well water for domestic and industrial water needs, including mirror washing, service water and fire protection water. The project would be PV, so no water would be required for the power generation cycle. 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, 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).

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.

Seismic Shaking

No active faults are present within the project boundaries or within a 1.5 mile radius of the site; 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 (NEBS2013a, Revised Petition to Amend § 3.1.6). 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.[6] 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.

[6] Current specific standard is ASCE/SEI 7-05 "Minimum Design Loads for Buildings and Other Structures, which is a referenced standard in extant version of the California Building Code (CBC) and applicable to this project under Condition of Certification GEN-1 in the **Facility Design** section of this document.

Flooding

Portions of the site lie within a 100-year or 500-year flood plain (PVSI2009a, 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 (up to 90 mph) are common in the region of the site, which could potentially cause damage to the PV panels. Project features would be built to withstand wind loading. Design would be in accordance with applicable LORS, including the 2010 California Building Code (NEBS2013a, Revised Petition to Amend § 2.2.2.3). Staff believes there are no special concerns with power plant functional reliability due to wind.

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 project owner'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.

CEQA LEVEL OF SIGNIFICANCE

This does not apply to power plant reliability.

NOTEWORTHY PUBLIC BENEFITS

This project 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.

PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

No Conditions of Certification are proposed.

CONCLUSIONS

The project owner has not assigned an availability factor that would lead to the conclusion that PV electric power generation is a mature technology. However, adequate design and construction practices would provide an adequate level of reliability and the attendant availability to support a satisfactory level of reliability. (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 BSPP would be built and would operate in a manner consistent with industry norms for reliable operation. No conditions of certification are proposed.

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TRANSMISSION SYSTEM ENGINEERING

Testimony of Sudath Edirisuriya and Mark Hesters

SUMMARY OF CONCLUSIONS

From its analysis of the BSPP interconnection facilities, as modified, staff has concluded that the amended Blythe Solar Power Project's (BSPP) 230-kV switchyard, single 230-kV overhead generator tie-line, and termination at the proposed Southern California Edison (SCE) 230-kV Colorado River Substation (CRS) would be adequate, in accordance with industry standards and good utility practices, and acceptable to staff as in conformance with applicable engineering laws, ordinances, regulations, and standards (LORS).

- The 485-megawatt (MW) modified project would eliminate the power blocks and the generator technology and replace them with either fixed-tilt or single-axis tracking photovoltaic (PV) modules, or a combination of the two.
- The approved on-site substation would be changed to a 230-kV ring bus switchyard to interconnect the plant reliably into the SCE's CRS.
- The modified 10-mile-long, single-circuit generator tie line would be capable of carrying the full load output of the project's design with double-bundle, 1272-kcmil conductors.

Staff's proposed Condition of Certification TSE -5 requires the submittal of the modified 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.

INTRODUCTION

STAFF ANALYSIS

This Transmission System Engineering analysis examines whether this project's proposed interconnection conforms to all LORS required for safe and reliable electric power transmission. Additionally, under the California Environmental Quality Act (CEQA), the California Energy Commission (Energy Commission) must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (Cal. Code Regs, tit. 14, § 15378). The Energy Commission must therefore identify the system impacts and any necessary new or modified transmission facilities downstream of the proposed interconnection that are both required for interconnection and represent the "whole of the action."

Energy Commission staff relies upon the interconnecting authority, in this case the California Independent System Operator (ISO), for the analysis of impacts on the transmission grid from the proposed interconnection, as well as for the identification and approval of new or modified facilities downstream that could be required for mitigation.

The proposed BSPP would connect to the SCE transmission system and require both analysis by SCE and approval by the California ISO.

CHANGING GENERATION TECHNOLOGY

The applicant filed a modification request to the California ISO for the change in generation technology from parabolic trough technology to a combination of fixed-tilt and single-axis tracking PV system. The approved project was originally licensed as a nominally rated 1000-MW solar thermal facility to be developed in four independent units, each with a capability of generating up to 250 MW. The modified PV project would have a nominal output of 485 MW and would consist of four operational units (phases). The first three phases would be approximately 125 MW each. The fourth phase would generate approximately 110 MW.

SOUTHERN CALIFORNIA EDISON'S ROLE

SCE is responsible for ensuring electric system reliability on its transmission system with the addition of proposed transmission modifications, and it both determines the standards necessary to ensure reliability and assesses whether the proposed transmission modifications conform to existing standards.

ROLE OF CALIFORNIA INDEPENDENT SYSTEM OPERATOR

The California ISO is responsible for dispatching generating units in California, establishing the order in which electricity will be used, ensuring electric system reliability for all participating transmission owners and developing the standards and procedures necessary for system reliability. The California ISO will review SCE's studies to ensure the adequacy of the proposed BSPP transmission interconnection. The California ISO will also determine the reliability impacts of the proposed transmission modifications on SCE's transmission system in accordance with all applicable reliability criteria. According to the California ISO Tariff, it 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, perform the BSPP Phase I Interconnection Study, provide its analysis, conclusions, and recommendations, and issue a preliminary approval or concurrence letter to SCE. On completion of the BSPP Phase II Interconnection Study, the California ISO will provide its conclusions and recommendations and issue a final approval/disapproval letter for the interconnection of the proposed generation project. If necessary, the California ISO will provide written and verbal testimony on its findings at the Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission General Order 95 (CPUC 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 General Order 128 (CPUC 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, 2012 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 NERC Standards TPL-001 through TPL-004 of the standards and “Table I. Transmission System Standards _ Normal and Emergency Conditions” 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 Ongoing).
- 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 Ongoing).

- 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, stability simulations, Special Protection Systems and Load Interruption Standards, 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 address in the NERC / WECC standards, provide interpretations of the NERC/WECC criteria specific to the ISO grid, and identify whether specific criteria should be adopted. 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. The California ISO standards will be revised from time to time to ensure they are consistent with the current state of the electrical industry and in conformance with NERC Reliability Standards and WECC Regional Criteria (California ISO June, 23 2011).
- 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 modified project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the Cost Responsibility of the proposed modified project and provides an Operational Review of all facilities that are to be connected to the California ISO grid (California ISO 2007a).

PROJECT DESCRIPTION

The applicant has proposed to interconnect the modified 485-MW BSPP to the SCE’s planned CRS. The BSPP would be located approximately 2 miles north of U.S. Interstate 10 and 8 miles west of the City of Blythe, in Riverside County, California. The BSPP would be a photovoltaic (PV) project that would use a fixed-tilt system or a single-axis tracking system, or a combination of the two systems, to generate electricity. The BSPP project would consist of four identical solar field phases (unit 1 to unit 4). Each phase would have its own solar field, with the first three phases capable of generating approximately 125 MW of nominal output, and the fourth phase generating approximately 110 MW of nominal output. The total of four solar fields is expected to generate approximately 485 MW. Each solar field would consist of rows of PV panels combined together through a series of intermediate steps to the power plant switchyard and then to SCE’s CRS.

The solar fields would be made up of a number of rows of PV panels, each row connected to a 500-ampere, 1000-VDC combiner box. The panels generate direct current (DC) power that must be converted to alternating current (AC) before it is transmitted to the grid. The combiner boxes would be connected to 500-kW, 340-VAC inverters that would change the power from DC to AC. The AC power would then be stepped up from 0.34 kV to 34.5 kV through pad mounted transformers rated at 1.12 MVA. The output from these transformers would connect to underground feeders that, in turn, would connect to overhead feeders and eventually the field main bus and step-up transformer. The main step-up transformer would raise the voltage from 34.5 kV to 230 kV. The 230-kV power from each of the three fields is then connected to the power plant switchyard (NEBC2013b, section 3.2, Appendix D, figs. 01, 02, E1, and E2).

SWITCHYARDS AND INTERCONNECTION FACILITIES

The modified project on-site ring-bus switchyard would consist of five 230-kV,3000-ampere breakers and ten 230-kV, 3000-ampere disconnect switches. The BSPP ring-bus switchyard would be connected to SCE's proposed CRS via a new 230-kV overhead generator tie-line, approximately 9.8 miles long, through 3,000-ampere disconnect switches and 3,000-ampere circuit breakers. This proposed gen-tie transmission line is the same route and length as the transmission line approved in the original thermal BSPP project. The 230-kV overhead generator tie-line would be constructed with double-bundled, 1272-kcmil (Bittern) conductors. The generator tie-line is capable of carrying the full output of the BSPP project. The single generator tie-line would be supported by 45-90-foot-tall, single-circuit towers. The BSPP project interconnection to the SCE grid would require a breaker-and-a-half bus configuration at the CRS. Three 230-kV, 3,000-ampere circuit breakers and six 230-kV, 3,000-ampere disconnect switches would be needed at the CRS for the interconnection of the BSPP. Power would be distributed to the SCE grid via transmission lines from the CRS (NEBC2013b, section 3.2, Appendix D, Figure 01, 02, E1, and E2).

INDEPENDENT SYSTEM OPERATOR INTERCONNECTION STUDIES

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 BSPP, SCE and the California ISO are responsible for ensuring grid reliability.

The California ISO studies the transmission reliability impacts of a proposed project in the Phase I and Phase II Interconnection Studies. The Phase I Interconnection Study is performed for a group of projects located in the same geographical area that apply for interconnection in the same request window. The Phase II Interconnection Study is performed after generators in each cluster meet specific milestones required to stay in the generator interconnection queue. The Phase II Interconnection Study is performed based on the number of generators left in each cluster.

Phase I Studies for projects in the transition cluster are 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 a project 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; California ISO 2007a; California ISO 2009a).

The Phase I Study analyzes the grid, with and without the generator or generators in a cluster, under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds by which grid reliability is determined. The studies must analyze the impact of the projects for their proposed first year(s) of operation and thus are based on a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnected utility, which would be SCE in the BSPP case. Generation and transmission forecasts are based on the interconnection queue. The studies are 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 Large Generator Interconnection Procedures (LGIP), generators are able to choose between “full-capacity” or “energy-only,” depending on whether the generator wants to have the right to generate energy 24 hours per day. A generator that chooses the full-capacity option would be required to pay for transmission network upgrades that would be needed to allow the generator to operate under virtually any system conditions and, as such, to sign contracts to provide capacity to utilities. Energy-only generators would not pay for network transmission upgrades, essentially would have access only to as-available transmission capacity, and likely would not be able to sign capacity contracts.

If the California ISO studies show that the interconnection of the project or cluster of projects causes the grid to be out of compliance with reliability standards, the studies 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,” Energy Commission staff must analyze those modifications or additions according to CEQA requirements. Where the Phase I Study identifies transmission modifications required for the reliable interconnection of a cluster of generators, staff will analyze the proposed 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.

SCOPE OF TRANSITION CLUSTER PHASE I AND PHASE II STUDIES

The July 28, 2009 Transition Cluster Phase I Interconnection Study for the BSPP was prepared by the California ISO in coordination with SCE. Fifteen queue generation projects, including the proposed 1000-MW BSPP, in the eastern Riverside County area, with a total of 10,040 MW of net generation output, were included in this cluster study. As of December 4, 2009, only 5 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 I 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/System Impact Study (SIS) to determine whether or not the proposed generation project would likely comply with reliability and to identify the transmission facilities required for reliable interconnection. For the BSPP Transition Cluster projects, the Phase I Study did not provide an accurate forecast of impacts of the BSPP on the SCE transmission grid. Therefore, staff has relied on the Phase II Study that was completed on July 8, 2010, and received on July 23, 2010, to determine the BSPP impact on grid reliability and to identify transmission upgrades for reliable interconnection.

The changes between the Transition Cluster Phase I and Phase II Group Studies for the Eastern Bulk System included the withdrawal of 10 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. Two of these projects, BSPP and the Palen Solar Power Project, are currently seeking amendments to their original certifications from the California Energy Commission. The third project, the Genesis Solar Energy Project, was certified by the Energy Commission in 2010.

The Phase II Group Study modeled the BSPP with a net output of 1,000 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 would 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 the Devers-Palo Verde 2 (DPV2) 500-kV transmission line, and the proposed 500-kV switchyard at the CRS. 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 equipment. 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 (Transition Cluster Phase II Interconnection Study Report, SCE's Eastern Bulk System).

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 conditions. 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, including BSPP, 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, the California ISO proposed mitigation 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 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, completion of the West-of-Devers upgrade projects, and the looping of the second 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 on 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, completion the West-of-Devers upgrade projects, and the looping of the second Colorado River-Devers 500-kV transmission line into the Red Bluff Substation are required to mitigate the power-flow impacts caused by the BSPP. The detailed electrical facilities needed to mitigate the overload criteria violations have been addressed and selected in the group report on 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 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
- Mira Loma-Vista 230-kV No. 2 line

Recommended Mitigation:

A combination of congestion management, completion of the West-of-Devers upgrade projects, and the looping of the second Colorado River-Devers 500-kV transmission line into the Red Bluff Substation are required to mitigate the power-flow impacts caused by the BSPP. The detailed electrical facilities needed to mitigate the overload criteria violations have been addressed and selected in the group report on SCE's Eastern Bulk System.

Short-Circuit Study Results, Mitigation Measures, and Substation Evaluation

Short-circuit studies were performed to determine the degree to which the addition of the Phase II Transition Cluster projects increases 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 percent 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: 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

To interconnect the BSPP to the CRS and deliver the power generated by the BSPP, the substation would require expansion to include a new 500/230-kV transformer and installation of the required interconnection equipment. Detailed substation upgrades are listed in the Transition Cluster Phase II Interconnection Study Report, Appendix A, Section 11.

Transient Stability Study Results and Mitigation Measures

Transient stability studies were conducted using the full-loop base cases to ensure that the transmission system would remain in operating equilibrium, as well as operate in a coordinated fashion through abnormal operating conditions after the Phase II Transition Cluster projects become 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 within the overall SCE Eastern Bulk System, in the East-of-Devers and West-of-Devers areas, were evaluated. The transient study identified system instability during the Category C (N-2) outages. Therefore, an SPS has been proposed as a mitigation measure that would curtail the 1,400 MW of generation of the Phase II Transition Cluster projects. The proposed BSPP 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 to determine the system performance according to the NERC/WECC planning criteria. The reactive power deficiency analysis included power-flow sensitivity analysis in the Eastern Bulk System. The study found no reactive deficiency from the BSPP project to the SCE bulk system.

CUMULATIVE IMPACT ANALYSIS

Staff has reviewed the lists of existing and foreseeable projects as presented in the Executive Summary of this SA. Staff's review considers whether the interconnection of BSPP 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 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 BSPP project, as identified in the Phase II Study, would be mitigated with the Energy Commission's incorporation of the mitigation measures and conditions of certification set forth in this section.

COMPLIANCE WITH LORS

The proposed interconnecting facilities, including the BSPP 230-kV switchyard, the single-circuit 230-kV overhead generator tie-line, and its termination at the new CRS are adequate, are in accordance with industry standards and good utility practices, and are acceptable to staff as in conformance with applicable engineering LORS. Conditions of certification **TSE-1** through **TSE-5**, as modified below, would help ensure that construction and operation of the transmission facilities for the proposed BSPP would comply with applicable LORS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments related to Transmission System Engineering have been received.

CONCLUSIONS

From its analysis of the BSPP interconnection facilities, as modified, staff has concluded that the ring-bus configuration of the 230-kV switchyard, the single 230-kV overhead generator tie-line, and its termination at the proposed Southern California Edison 230-kV CRS would be adequate, in accordance with industry standards and good utility practices, and acceptable to staff as in conformance with applicable LORS.

- The 485-MW modified project would eliminate the power blocks and the generator technology and replace them with either fixed-tilt or single-axis tracking PV modules, or a combination of the two.
- The approved on-site substation would be changed to a 230-kV ring bus switchyard to interconnect the plant reliably into SCE's CRS.

- The modified 10-mile-long, single-circuit generator tie line would be capable of carrying the full load output of the project's design with double-bundle, 1272-kcmil conductors.

Staff's proposed Condition of Certification TSE -5 requires the submittal of the modified 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.

CONDITIONS OF CERTIFICATION

Staff has proposed modifications to the existing **Transmission System Engineering** Conditions of Certification as shown below. Deleted text is in ~~strikethrough~~. New text is in **<u>bold</u>** and **<u>underlined</u>**.

TSE-1 The project owner shall provide the Compliance Project Manager (CPM) and the Chief Building Official (CBO) with 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 both a description and a 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.

<u>Verification:</u> Prior to the start of construction of transmission facilities, the project owner shall submit the schedule, a master drawing list, and a master specifications list to both the CBO and the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in Table 1: Major Equipment List**<u>,</u>** below). Additions and deletions shall be made to the table only with both CPM and CBO approval. The project owner shall provide schedule updates in the monthly compliance report.

Table 1: Major Equipment List
Breakers
Step-up transformer
Switchyard
Busses
Surge arrestors
Disconnects
Take-off facilities
Electrical control building

Switchyard control building
Transmission pole/tower
Grounding system

TSE-2 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 **of Certification** **GEN-5**, may be responsible for design and review of the T**ransmission** S**ystem** E**ngineering** 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 with the predicted conditions used as the basis for design of earth work or foundations.

The electrical engineer shall:

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

b. 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 five **(5)** days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five **(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 five **(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, **§** 108.4, approval required; Chapter 17, **§** 1701.3, *Duties and Responsibilities of the Special Inspector;* Appendix**,** Chapter 33, **§** 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~~ **with** refer**ence** 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 five **(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 **(1)** 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 ~~m~~**M**onthly ~~c~~**C**ompliance ~~r~~**R**eport:

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. The project owner shall send the CPM a copy of the transmittal letter in the next ~~m~~**M**onthly ~~c~~**C**ompliance ~~r~~**R**eport.

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.

a. **The project shall be interconnected to the Southern California Edison (SCE) grid via a segment of 10-mile-long, 230-kV, single-circuit generator tie line, extending from the project site switchyard to the Colorado River Substation. The single circuit shall be constructed with double-bundle, 1272-kcmil Aluminum Cable Steel Reinforced (ACSR) conductors. The on-site switchyard shall be built with five 230-kV, 3000-ampere circuit breakers and ten 230-kV, 3000-ampere disconnect switches.**

b. The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 **(CPUC GO-95);** ~~or~~ National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8 CCR); Articles 35, 36**,** and 37 of the *High Voltage Electric Safety Orders*~~,~~**;** California **Independent System Operator (**ISO**)** standards~~,~~**;** National Electric Code (NEC)**;** and related industry standards.

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

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

e. The project conductors shall be sized to accommodate the full output of the project.

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

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. The final Phase II Interconnection Study, including a description of facility upgrades, operational mitigation measures, and/or special protection system sequencing and timing if applicable; and~~

iv. A copy of the executed **Large Generator Interconnection Agreement (**LGIA**)** signed by the California ISO and the project owner.

Verification: Prior to the start of construction of transmission facilities, the project owner shall submit to the CBO for approval:

1. Design drawings, specifications, and calculations conforming with CPUC ~~General Order~~ **GO-**95**;** or ~~National Electric Safety Code (~~NESC~~)~~; ~~Title 8 of the California Code and Regulations (~~Title 8 **CCR**~~)~~; Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*~~,~~**;** CA 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"~~[1]~~ (for example, a dead-end or angle pole~~.~~)**;** 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 **the following:** CPUC General Order 95**;** ~~or National Electric Safety Code (~~NESC~~)~~; ~~Title 8 of the California Code and Regulations (~~Title 8 **CCR**~~)~~; 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~~)~~, above;
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~~,~~**;**
6. The final Phase II Interconnection 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 or modification of transmission facilities, the project owner shall inform the CBO and the CPM of any anticipated changes to the design that make it different from the design previously submitted and approved. The project owner shall submit a detailed description of the proposed change(s) and a complete engineering, environmental, and economic rationale for the change(s) to the CPM and CBO for review and approval.

TSE-6 The project owner shall provide the following ~~N~~**n**otice to the ~~California Independent System Operator (~~California ISO~~)~~ prior to synchronizing the facility with the California Transmission ~~s~~**S**ystem:

~~[1] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.~~

a. At least one **(1)** week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and

b. 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 **(1)** 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 **(1)** 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~~,~~ CCR,; Articles 35, 36, and 37 of the~~,~~ “High Voltage Electric Safety Orders;”~~,~~ applicable interconnection standards~~,~~; NEC; and 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.

REFERENCES

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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 Management
Congestion management is a scheduling protocol, which provides that 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.

RAS............................. Remedial Action Scheme; a remedial action scheme is an automatic control provision, which, for instance, would trip a selected generating unit upon a circuit overload.

SPS .... Special Protection Systems

SSAC .... Steel Supported Aluminum Conductor.

SF6.............................. Sulfur hexafluoride; an insulating medium.

Single Contingency ..... Also known as emergency, or N-1, condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid Dielectric Cable .. Copper or aluminum conductors that are insulated by solid 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

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.

ALTERNATIVES

Jeff Juarez

THIS SECTION WILL BE PROVIDED IN THE STAFF ASSESSMENT – Part B

COMPLIANCE CONDITIONS
AND
COMPLIANCE MONITORING PLAN

Testimony of Mary Dyas

INTRODUCTION

The project's Compliance Conditions of Certification, including a Compliance Monitoring Plan (Compliance Plan), were established as required by Public Resources Code section 25532. The Compliance Plan, applicable to the Blythe Solar Power Project (BSPP), provides a means for assuring that the facility is constructed, operated, and closed in compliance with public health and safety, environmental, all other applicable laws, ordinances, regulations, and standards (LORS), and the conditions adopted by the Energy Commission and specified in the written Decision on the Amendment, or otherwise required by law.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner or operator (project owner), delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- set forth the procedures for settling disputes and making post-certification changes;
- set forth the requirements for periodic compliance reports and other administrative procedures necessary to verify the compliance status of all Energy Commission-approved conditions of certification;
- establish emergency response contingency planning, facility non-operation protocols, and closure requirements; and
- establish a tracking method for the technical area conditions of certification that contain measures required to mitigate potentially adverse project impacts associated with construction, operation, and closure to less than a level of significance. Each technical condition of certification also includes one or more verification provisions that describe the means of assuring that the condition has been satisfied.

KEY PROJECT DEFINITIONS

The following terms and definitions help determine when various conditions of certification are implemented.

Project Certification

Project certification occurs on the day the Energy Commission dockets its Decision after adopting it at a publically noticed Business Meeting or hearing. At that time, all Energy Commission conditions of certification become binding on the project owner and the proposed facility.

Site Assessment and Pre-Construction Activities

The below-listed site assessment and pre-construction activities may be initiated or completed prior to the start of construction, subject to the CPM's approval of the specific site assessment or pre-construction activities.

Site assessment and pre-construction activities include the following, but only to the extent the activities are minimally disruptive to soil and vegetation and will not affect listed or special-status species or other sensitive resources:

1. the installation of environmental monitoring equipment;
2. a minimally invasive soil or geological investigation;
3. a topographical survey;
4. any other study or investigation, such as preconstruction surveys and tortoise clearance work, other work to determine the environmental acceptability or feasibility of the use of the site for any particular facility, or any other CPM approved activities; and,
5. any minimally invasive work to provide safe access to the site for any of the purposes specified in 1-4 above.

Site Mobilization and Construction

When a condition of certification requires the project owner to take an action or obtain CPM approval prior to the start of construction, or within a period of time relative to the start of construction, that action must be taken, or approval must be obtained, prior to any site mobilization or construction activities, as defined below.

Site mobilization and construction activities are those necessary to provide site access for construction mobilization and facility installation, including both temporary and permanent equipment and structures, as determined by the CPM.

Site mobilization and construction activities include, but are not limited to:

1. ground disturbance activities like grading, boring, trenching, leveling, mechanical clearing, mowing, grubbing, and scraping;

2. site preparation activities, such as access roads, temporary fencing, trailer and utility installation, construction equipment installation and storage, equipment and supply laydown areas, borrow and fill sites, temporary parking facilities, and chemical spraying and controlled burns; and,
3. permanent installation activities for all facility and linear structures, including access roads, fencing (including tortoise fencing), utilities, parking facilities, equipment storage, mitigation and landscaping activities, and other installations, as applicable.

System Commissioning and Decommissioning

Commissioning activities are designed to test the functionality of a facility's installed components and systems to ensure safe and reliable operation. Although decommissioning is often synonymous with facility closure, specific decommissioning activities also systematically test the removal of such systems to ensure a facility's safe closure. For compliance monitoring purposes, commissioning examples include interface connection and utility pre-testing, "cold" and "hot" electrical testing, system pressurization and optimization tests, grid synchronization, and combustion turbine "first fire." Decommissioning activity examples include utility shut down, system depressurization and de-electrification, structure removal, and site reclamation.

Start of Commercial Operation

For compliance monitoring purposes, "commercial operation" or "operation" begins once commissioning activities are complete, the certificate of occupancy has been issued, and the power plant has reached reliable steady-state electrical production. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager. Operation activities can include a steady state of electrical production, or, for "peaker plants," a seasonal or on-demand operational regime to meet peak load demands.

Non-Operation and Closure

Non-operation is time-limited and can encompass part or all of a facility. Non-operation can be a planned event, usually for minor equipment maintenance or repair, or unplanned, usually the result of unanticipated events or emergencies.

Closure is a facility shutdown with no intent to restart operation. It may also be the cumulative result of unsuccessful efforts to re-start over an increasingly lengthy period of non-operation, condemned by inadequate means and/or lack of a viable plan. Facility closures can occur due to a variety of factors, including, but not limited to, irreparable damage and/or functional or economic obsolescence.

ROLES AND RESPONSIBILITIES

Provided below is a generalized description of the compliance roles and responsibilities for Energy Commission staff (staff) and the project owner for the construction and operation of the BSPP:

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The CPM's compliance monitoring and project oversight responsibilities include:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Decision;
2. resolving complaints;
3. processing post-certification project amendments for changes to the project description, conditions of certification, ownership or operational control, and requests for extension of the deadline for the start of construction (see **COM-10** for instructions on filing a Petition to Amend or to extend construction start date);
4. documenting and tracking compliance filings; and,
5. ensuring that compliance files are maintained and accessible.

The CPM is the central contact person for the Energy Commission during project pre-construction, construction, operation, emergency response, and closure. The CPM will consult with the appropriate responsible parties when handling compliance issues, disputes, complaints, and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal requires CPM approval, the approval will involve appropriate Energy Commission technical staff and management. All submittals must include searchable electronic versions (.pdf, MS Word, or equivalent files).

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. These meetings are used to assist the Energy Commission and the project owner's technical staff in the status review of all required pre-construction or pre-operation conditions of certification, and take proper action if outstanding conditions remain. In addition, these meetings ensure, to the extent possible, that the Energy Commission's conditions of certification do not delay the construction and operation of the plant due to last-minute unforeseen issues or a compliance oversight. 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 maintains the following documents and information as public records, in either the Compliance files or Dockets files, for the life of the project (or other period as specified):

1. all documents demonstrating compliance with any legal requirements relating to the construction, operation, and closure of the facility;
2. all Monthly and Annual Compliance Reports (MCRs, ACRs) filed by the project owner;
3. all project-related complaints of alleged noncompliance filed with the Energy Commission; and,

4. all petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

CHIEF BUILDING OFFICIAL DELEGATION AND AGENCY COOPERATION

Under the California Building Code Standards, while monitoring project construction and operation, staff acts as, and has the authority of, the Chief Building Official (CBO). Staff may delegate CBO responsibility to either an independent third-party contractor or a local building official. However, staff retains CBO authority when selecting a delegate CBO, including the interpretation and enforcement of state and local codes, and the use of discretion, as necessary, in implementing the various codes and standards. The delegate CBO will also be responsible to facilitate compliance with all environmental Conditions of Certification, including Cultural Resources, and the implementation of all appropriate codes and standards and Energy Commission requirements. The CBO shall conduct on-site (including linear facilities) reviews and inspections at intervals necessary to fulfill those responsibilities. The project owner will pay all delegate CBO fees necessary to cover the costs of these reviews and inspections.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that all conditions of certification in the BSPP Decision are satisfied. The project owner will submit all compliance submittals to the CPM for processing unless the conditions specify another recipient. The **Compliance** Conditions regarding post-certification changes specify measures that the project owner must take when modifying the project's design, operation, or performance requirements, or to transfer ownership or operational control. Failure to comply with any of the conditions of certification may result in a correction order, an administrative fine, certification revocation, or any combination thereof, as appropriate. A summary of the **Compliance** Conditions of Certification is included as **Compliance Table 1** at the end of this Compliance Plan.

COMPLIANCE ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision are specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke a project certification and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Decision. The Energy Commission's actions and fine assessments would take into account the specific circumstances of the incident(s).

PERIODIC COMPLIANCE REPORTING

Many of the conditions of certification require submittals in the MCRs and ACRs. All compliance submittals assist the CPM in tracking project activities and monitoring compliance with the terms and conditions of the BSPP Decision. During construction, the project owner or an authorized agent will submit compliance reports on a monthly basis. During operation, compliance reports are submitted annually. These reports and the requirements for an accompanying compliance matrix are described below.

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 issue(s) can be resolved by using an informal dispute resolution process. Both the informal and formal complaint procedures, as described in current state law and regulations, are summarized below. Energy Commission staff will follow these provisions unless superseded by future law or regulations. The California Office of Administrative Law provides on-line access to the California Code of Regulations at http://www.oal.ca.gov/.

Informal Dispute Resolution Process

The following informal process is designed to resolve code and compliance interpretation disputes stemming from the project's conditions of certification and other LORS. The project owner, the Energy Commission, or any other party, including members of the public, may initiate the 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 formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, but is not intended to be a prerequisite or substitute for it. This informal procedure may not be used to change the terms and conditions of certification in the Decision, although the agreed-upon resolution may result in a project owner proposing an amendment. The informal dispute resolution process encourages all parties to openly discuss the conflict and reach a mutually agreeable solution. 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 specified in Title 20, California Code of Regulations, section 1237.

Request for Informal Investigation

Any individual, group, or agency may request that the CPM conduct an informal investigation of alleged noncompliance with the Energy Commission's conditions of certification. Upon receipt of an informal investigation request, the CPM will promptly provide both verbal and written notification to the project owner of the allegation(s), along with all known and relevant information of the alleged noncompliance. The CPM will evaluate the request and, if the CPM determines that further investigation is necessary, will ask the project owner to promptly conduct a formal inquiry into the matter and provide within seven days a written report of the investigation results, along with corrective measures proposed or undertaken. Depending on the urgency of the matter, the CPM may conduct a site visit and/or request that the project owner provide an initial verbal report within 48 hours.

Request for Informal Meeting

In the event that either the requesting party or Energy Commission staff are not satisfied with the project owner's investigative report or corrective measures, either party may submit a written request to the CPM for a meeting with the project owner. The request shall be made within 14 days of the project owner's filing of the required investigative report. Upon receipt of such a request, the CPM will attempt to:

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

After the meeting, the CPM will promptly prepare and distribute copies to all parties, and to the project file, of a summary memorandum that fairly and accurately identifies the positions of all parties and any understandings reached. If no agreement was reached, the CPM will direct the complainant to the formal complaint process provided under Title 20, California Code of Regulations, section 1237.

Formal Dispute Resolution Procedure

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

POST-CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, to modify the design, operation, or performance requirements of the project and/or the linear facilities, or 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 approval may result in an enforcement action including civil penalties in accordance with Public Resources Code, section 25534.

Below is a summary of the criteria for determining the type of approval process required, and reflects the provisions of Title 20, California Code of Regulations, section 1769, at the time this Compliance Plan was drafted. If the Energy Commission modifies this regulation, the language in effect at the time of the requested change shall apply. Upon request, the CPM can provide sample formats of these submittals.

Amendment

The project owner shall submit a Petition to Amend the Energy Commission Decision, pursuant to Title 20, California Code of Regulations, section 1769 (a), when proposing modifications to the design, operation, or performance requirements of the project and/or the linear facilities. If a proposed modification results in an added, changed, or deleted condition of certification, or makes changes causing noncompliance with any applicable LORS, the petition will be processed as a formal amendment to the Decision, triggering public notification of the proposal, public review of the Energy Commission staff's analysis, and approval by the full Energy Commission.

Change of Ownership and/or Operational Control

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).

Staff-Approved Project Modification

Modifications that do not result in additions, deletions, or changes to the conditions of certification, that are compliant with the applicable LORS, and that 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 the CPM files a Notice of Determination of the proposed project modifications, any person may file an objection to the CPM's determination within 14 days of service on the grounds that the modification does not meet the criteria of section 1769 (a)(2). If there is a valid objection to the CPM's determination, the petition must be processed as a formal amendment to the Decision and must be considered for approval by the full Commission at a publically noticed Business Meeting or hearing.

Verification Change

Each condition of certification (except for the **Compliance** Conditions) has one or more means of verifying the project owner's compliance with the provisions of the condition. These verifications specify the actions and deadlines by which a project owner demonstrates compliance with the Energy Commission-adopted conditions. A verification may be modified by the CPM without requesting a Decision amendment if the change does not conflict with any condition of certification, does not violate any LORS, and provides an effective alternative means of verification.

EMERGENCY RESPONSE CONTINGENCY PLANNING AND INCIDENT REPORTING

To protect public health and safety and environmental quality, the conditions of certification include contingency planning and incident reporting requirements to ensure compliance with necessary health and safety practices. A well-drafted contingency plan avoids or limits potential hazards and impacts resulting from serious incidents involving personal injury, hazardous spills, flood, fire, explosions or other catastrophic events and ensures a comprehensive timely response. All such incidents must be reported immediately to the CPM and documented. These requirements are designed to build from "lessons learned" limit the hazards and impacts, anticipate and prevent recurrence, and provide for the safe and secure shutdown and re-start of the facility.

FACILITY CLOSURE

The Energy Commission cannot reasonably foresee all potential circumstances in existence when a facility permanently closes. Therefore, the closure conditions provided herein strive for the flexibility to address circumstances that may exist at some future time. Most importantly, facility closure must be consistent with all applicable Energy Commission conditions of certification and the LORS in effect at that time.

Although a non-operational facility may intend to resume operations, if it remains non-operational for longer than one year and the project owner does not present a viable plan to resume operation, the Energy Commission can conclude that closure is imminent and direct the project owner to commence closure procedures under the jurisdiction and guidance of the Bureau of Land Management.

Prior to submittal of the facility's Final Closure Plan to the Energy Commission, the project owner and the CPM will hold a meeting to discuss the specific contents of the plan. In the event that significant issues are associated with the plan's approval, the CPM will hold one or more workshops and/or the Commission may hold public hearings as part of its approval procedure.

With the exception of measures to eliminate any immediate threats to public health and safety or to the environment, facility closure activities cannot be initiated until the Energy Commission approves the Final Closure Plan and Cost Estimate and the project owner complies with any requirements the Commission may incorporate as conditions of approval of the Final Closure Plan.

COMPLIANCE CONDITIONS OF CERTIFICATION

Staff has proposed modifications to the Compliance Conditions of Certification as shown below. Deleted text is in strikethrough. New text is **bold** and **underlined**.

COM-1: Unrestricted Access~~Compliance-1~~**. The project owner shall take all steps necessary to ensure that the CPM, responsible Energy Commission staff, and delegate agencies or consultants have unrestricted access to the facility site, related facilities, project-related staff, and the records maintained on-site to facilitate audits, surveys, inspections, and general or closure-related 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, whether such visits are by the CPM in person or through representatives from Energy Commission staff, delegate agencies, or consultants.** ~~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.~~

COM-2: Compliance Record~~Compliance-2~~**. The project owner shall maintain electronic copies of all project files and submittals on-site, or at an alternative site approved by the CPM, for the operational life and closure of the project. The files shall also contain at least one hard copy of:**

1. **the facility's Application for Certification;**
2. **all amendment petitions and Energy Commission orders;**

3. **all site-related environmental impact and survey documentation;**
4. **all appraisals, assessments, and studies for the project;**
5. **all finalized original and amended structural plans and "as-built" drawings for the entire project;**
6. **all citations, warnings, violations, or corrective actions applicable to the project; and,**
7. **the most current versions of any plans, manuals, and training documentation required by the conditions of certification or applicable LORS.**

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. ~~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.~~

COM-3: Compliance Verification Submittals~~Compliance-3~~**. Verification lead times associated with the start of construction or closure may require the project owner to file submittals during the AFC process, particularly if construction is planned to commence shortly after certification. The verification procedures, unlike the conditions, may be modified as necessary by the CPM.**

A cover letter from the project owner or an 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, cite the appropriate condition of certification number(s), and give a brief description of the subject of the submittal. When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal and the condition(s) of certification applicable.

All reports and plans required by the project's conditions of certification shall be submitted in a searchable electronic format (.pdf, MS Word or Excel, etc.) and include standard formatting elements such as a table of contents, identifying by title and page number, each section, table, graphic, exhibit, or addendum. All report and/or plan graphics and maps shall be adequately scaled and shall include a key with descriptive labels, directional headings, a bar scale, and the most recent revision date.

The project owner is responsible for the content and delivery of all verification submittals to the CPM, whether the actions required by the verification were satisfied by the project owner or an agent of the project owner. All submittals shall be accompanied by an electronic copy on an electronic storage medium, or by e-mail, as agreed upon by the CPM. If hardcopy submittals are required, please address as follows:

Mary Dyas, Compliance Project Manager
Blythe Solar Power Project (09-AFC-6C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

~~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:~~

~~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.~~

COM-4: Pre-Construction Matrix and Tasks Prior to Start of Construction~~Compliance-4~~**. Prior to start of construction, the project owner shall submit to the CPM a compliance matrix including only those conditions that must be fulfilled before the start of construction.** The matrix shall be included with the project owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first~~. It will~~ **, and shall** be submitted in a format similar to ~~the description~~**that 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.~~

Site mobilization and construction activities shall not start until all of the following occur: the project owner has submitted the pre-construction matrix and compliance verifications pertaining to all pre-construction conditions of certification; and the CPM has issued an authorization-to-construct letter to the project owner. The deadlines for submitting various compliance verifications to the CPM allow sufficient staff time to review and comment on, and if necessary, allow the project owner to revise the submittal in a timely manner. These procedures help ensure that project construction proceeds according to schedule. Failure to submit required compliance documents by the specified deadlines may result in delayed authorizations to commence various stages of the project.

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

~~If the project owner anticipates commencing project construction as soon as the project is certified,~~ **If the project owner anticipates site mobilization immediately following project certification,** it may be necessary for the project owner to file compliance submittals prior to project certification. **In these instances, compliance verifications can be submitted in advance of the required deadlines and the anticipated authorizations to start construction. The project owner must understand that submitting compliance verifications prior to these authorizations is at the owner's own risk. Any approval by Energy Commission staff prior to project certification is subject to change based upon the Commission Decision, or amendment thereto, and early staff compliance approvals do not imply that the Energy Commission will certify the project for actual construction and operation.** ~~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.~~

COM-5: Compliance Matrix~~Compliance-5~~**.** ~~A compliance matrix shall be submitted by the project owner to the CPM along with each~~ **The project owner shall submit a compliance matrix to the CPM with each** ~~Monthly and Annual Compliance Report~~**MCR and ACR.** The compliance matrix ~~is intended to~~ provide**s** the CPM with the ~~current~~ status of all conditions of certification in a spreadsheet format. The compliance matrix shall 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 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 updated language and the date the amendment was proposed or approved.** ~~the date of the amendment.~~

The CPM can provide a template for the compliance matrix upon request. ~~Satisfied conditions shall be placed at the end of the matrix.~~

COM-6: Monthly Compliance Reports and Key Events List~~Compliance-6~~**.** The first ~~Monthly Compliance Report~~ **MCR** is due one (1) month following the ~~Energy Commission business meeting date upon which the project was approved, the~~ **docketing of the project's Decision,** unless otherwise agreed to by the CPM. The first ~~Monthly Compliance Report~~ **MCR** shall include the AFC number and an initial list of dates for each of the events identified on the Key Events List ~~found at the end of this section of the Decision~~. **(The Key Events List form is found at the end of this Compliance Plan.)**

During **project** pre-construction**,** ~~and~~ construction**, or closure** ~~of the project~~, the project owner or authorized agent shall submit an ~~original and an~~ electronic searchable version of the ~~Monthly Compliance Report~~ **MCR** within ten (10) **business** days after the end of each reporting month, unless otherwise specified by the CPM. ~~Monthly Compliance Reports~~ **MCRs** shall be clearly identified for the month being reported. The searchable electronic copy may be filed on an electronic storage medium or by e-mail, subject to CPM approval. The compliance verification submittal condition provides guidance on report production standards, and the ~~Monthly Compliance Report~~ **MCR** 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~~ **MCR**~~.~~**;** ~~E~~**e**ach of these items shall be identified in the transmittal letter, as well as the conditions they satisfy**,** and submitted as attachments to the ~~Monthly Compliance Report~~ **MCR**;

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 list~~ing~~ of any approved changes to **the** conditions of certification;

7. a list~~ing~~ of any filings submitted to, ~~or~~**and** permits issued by, other governmental agencies during the month;

8. a projection of project compliance activities scheduled during the next two months**;** ~~T~~**t**he 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 list~~ing~~ of the month's additions to the on-site compliance file; and

10. a list~~ing~~ of complaints, notices of violation, official warnings, and citations received during the month, a description of the **actions taken to date to resolve** ~~resolution of the resolved actions,~~ **the issues**; and the status of any unresolved actions.

~~All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by the CPM.~~

COM-7: Annual Compliance Reports~~Compliance-7~~**.** After construction is complete, the project owner shall submit searchable electronic ~~Annual Compliance Reports~~**ACRs** instead of ~~Monthly Compliance Reports~~**MCRs**. ~~The~~ **ACRs** ~~reports are~~ **shall be completed** for each year of commercial operation**, may be required for a specified period after decommissioning to monitor closure compliance, as specified by the CPM,** and are due ~~to the CPM~~ each year on 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.~~ The searchable electronic ~~copy~~**copies** may be filed on an electronic storage medium or by e-mail, subject to CPM approval. Each ~~Annual Compliance Report~~ ACR 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~~ **ACR**. Each of these items shall be identified in the transmittal letter with the condition it satisfies, and submitted as attachments to the ~~Annual Compliance Report~~ **ACR**;

4. a cumulative list~~ing~~ 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 list~~ing~~ 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 list~~ing~~ of the year's additions to the on-site compliance file;
9. an evaluation of the ~~on-site~~ **Site Contingency Plan, including amendments and plan updates** ~~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 list~~ing~~ of complaints, notices of violation, official warnings, and citations received during the year, a description of **how the issues were resolved**~~the resolution of any resolved matters~~, and the status of any unresolved matters.

COM-8: Confidential Information~~Compliance-8~~**.** Any information that the project owner ~~deems~~**designates as** 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~~ **deemed confidential pursuant to the regulations will remain undisclosed,** as provided ~~for~~ in Title 20, California Code of Regulations, section 2501~~, et. seq~~.

COM-9: Annual Energy Facility Compliance Fee. Pursuant to the provisions of section 25806 (b) of the Public Resources Code, the project owner is required to pay an annually adjusted compliance fee. Current compliance fee information is available on the Energy Commission's website at http://www.energy.ca.gov/siting/filing_fees.html. The project owner may also contact the CPM for the current fee information. The initial payment is due on the date the Energy Commission dockets its final Decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification.

COM-10: Amendments, Staff-Approved Project Modifications, Ownership Changes, and Verification Changes. The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, section 1769, to modify the design, operation, or performance requirements of the project or linear facilities, or to transfer ownership or operational control of the facility. The CPM will determine whether staff approval will be sufficient or whether Commission approval will be necessary~~.~~ It is the project owner's responsibility to contact the CPM to determine if a proposed project change triggers the requirements of section 1769. Section 1769 details the required contents for a Petition to Amend an

Energy Commission Decision. The only change that can be requested by means of a letter to the CPM is a request to change the verification method of a condition of certification.

Implementation of a project modification without first securing Energy Commission, or Energy Commission staff approval, may result in an enforcement action, including civil penalties, in accordance with section 25534 of the Public Resources Code. If the Energy Commission's rules regarding amendments are revised, the rules in effect at the time the change is requested shall apply.

COM-11: Reporting of Complaints, Notices, and Citations~~Compliance-9~~**. Prior to the start of construction or decommissioning, the project owner shall send a letter to property owners within one (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 twenty-four (24) hours per day, it shall include automatic answering with a date and time stamp recording.**

The project owner shall respond to all recorded complaints within twenty-four (24) hours or the next business day. The project site shall post the telephone number on-site and make it easily visible to passersby during construction, operation, and closure. The project owner shall provide the contact information to the CPM who will post it on the Energy Commission's web page at http://www.energy.ca.gov/sitingcases/blythe_solar/. The project owner shall report any disruption to the contact system or telephone number change to the CPM promptly, to allow the CPM to update the Energy Commission's facility webpage accordingly.

In addition to including all complaints, notices, and citations included with the MCRs and ACRs, within ten (10) days of receipt, the project owner shall report, and provide copies to the CPM, of all complaints, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the Noise and Vibration Conditions of Certification. All other complaints shall be recorded on the complaint form (Attachment A) at the end of this Compliance Plan.

COM-12: Emergency Response Site Contingency Plan. No less than sixty (60) days prior to the start of commercial operation, or other date agreed to by the CPM, the project owner shall submit for CPM review and approval, an Emergency Response Site Contingency Plan (Contingency Plan). The Contingency Plan shall evidence a facility's coordinated emergency response and recovery preparedness for a series of reasonably foreseeable emergency events. The CPM may require the updating of the

Contingency Plan over the life of the facility. Contingency Plan elements include, but are not limited to:

1. a site-specific list and direct contact information for persons, agencies, and responders to be notified for an unanticipated event;
2. a detailed and labeled facility map, including all fences and gates, the windsock location (if applicable), the on- and off-site assembly areas, and the main roads and highways near the site;
3. a detailed and labeled map of population centers, sensitive receptors, and the nearest emergency response facilities;
4. a description of the on-site, first response and backup emergency alert and communication systems, site-specific emergency response protocols, and procedures for maintaining the facility's contingency response capabilities, including a detailed map of interior and exterior evacuation routes, and the planned location(s) of all permanent safety equipment;
5. an organizational chart including the name, contact information, and first aid/emergency response certification(s) and renewal date(s) for all personnel regularly on-site;
6. a brief description of reasonably foreseeable, site-specific incidents and accident sequences (on- and off-site), including response procedures and protocols and site security measures to maintain twenty-four-hour site security;
7. procedures for maintaining contingency response capabilities; and
8. the procedures and implementation sequence for the safe and secure shutdown of all non-critical equipment and removal of hazardous materials and waste (see also specific conditions of certification for the technical areas of Public Health, Solid Waste Management, Hazardous Materials Management, and Worker Safety).

COM-13: Incident-Reporting Requirements. Within one (1) hour, the project owner shall notify the CPM or Compliance Office Manager, by telephone and e-mail, of any incident at the power plant or appurtenant facilities that results or could result in any of the following:

1. reduction in the facility's ability to respond to dispatch (excluding forced outages caused by protective equipment or other typically encountered shutdown events);
2. health and safety impacts on the surrounding population;
3. property damage off-site;
4. response by off-site emergency response agencies;
5. serious on-site injury;

6. serious environmental damage; or
7. emergency reporting to any federal, state, or local agency.

The notice shall describe the circumstances, status, and expected duration of the incident.

If warranted, as soon as it is safe and feasible, the project owner shall implement the safe shutdown of any non-critical equipment and removal of any hazardous materials and waste that pose a threat to public health and safety and to environmental quality (also, see specific conditions of certification for the technical areas of Hazardous Materials Management and Solid Waste Management).

Within one (1) week ~~of the occurrence~~ of the incident, the project owner shall submit to the CPM a detailed incident report, which shall include, as appropriate ~~to the incident~~, the following information:

1. a brief description of the incident, including its date, time, and location;
2. a description of the cause of the incident, or likely causes if it is still under investigation;
3. the location of any off-site impacts;
4. description of any resultant impacts;
5. a description of emergency response actions associated with the incident;
6. identification of responding agencies;
7. identification of emergency notifications made to ~~other~~ federal, state, and/or local agencies;
8. identification of any hazardous materials released and an estimate of the quantity released;
9. a description of any injuries, fatalities, or property damage that occurred as a result of the incident;
10. fines or violations assessed or being processed by other agencies;
11. name, phone number, and e-mail address of the appropriate facility contact person having knowledge of the event; and
12. corrective actions to prevent a recurrence of the incident.

The project owner shall maintain all incident report records for the life of the project, including closure. After the submittal of the initial report for any incident, the project owner shall submit to the CPM copies of incident reports within twenty-four (24) hours of a request.

COM-14: Non-Operation. If the facility ceases operation temporarily, either planned or unplanned, for longer than one (1) week (or other CPM-approved date), but less than three (3) months (or other CPM-approved date), the project owner shall notify the CPM, interested agencies, and nearby property owners. Notice of planned non-operation shall be given at least two (2) weeks prior to the scheduled date. Notice of unplanned non-operation shall be provided no later than one (1) week after non-operation begins.

For any non-operation, a Repair/Restoration Plan for conducting the activities necessary to restore the facility to availability and reliable and/or improved performance shall be submitted to the CPM within one (1) week after notice of non-operation is given. If non-operation is due to an unplanned incident, temporary repairs and/or corrective actions may be undertaken before the Repair/Restoration Plan is submitted. The Repair/Restoration Plan shall include:

1. **identification of operational and non-operational components of the plant;**
2. **a detailed description of the repair or restoration activities;**
3. **a proposed schedule for completing the repair or restoration activities;**
4. **an assessment of whether or not the proposed activities would require changing, adding, and/or deleting any conditions of certification and/or would cause noncompliance with any applicable LORS; and**
5. **planned activities during non-operation, including any measures to ensure continued compliance with all conditions of certification and LORS.**

Written updates to the CPM for non-operational periods, until operation resumes, shall include:

1. **progress relative to the schedule;**
2. **developments that delayed or advanced progress or that may delay or advance future progress;**
3. **any public, agency, or media comments or complaints; and**
4. **projected date for the resumption of operation.**

During non-operation, all applicable conditions of certification and reporting requirements remain in effect. If, after one (1) year from the date of the project owner's last report of productive Repair/Restoration Plan work, the facility does not resume operation or does not provide a plan to resume operation, the Executive Director may assign suspended status to the facility and recommend commencement of permanent closure activities.

1. If the facility has a closure plan, the project owner shall update it and submit it for Energy Commission review and approval.

2. If the facility does not have a closure plan, the project owner shall develop one consistent with the requirements in this Compliance Plan and submit it for Energy Commission review and approval.

COM-15: Facility Closure Planning. To ensure that a facility's eventual permanent closure and long-term maintenance do not pose a threat to public health and safety and/or to environmental quality, the project owner shall coordinate with the Energy Commission to plan and prepare for eventual permanent closure.

A. Provisional Closure Plan and Estimate of Permanent Closure Costs
To assure satisfactory long-term site maintenance and adequate closure for "the whole of a project," the project owner shall submit a Provisional Closure Plan and Cost Estimate for CPM review and approval within sixty (60) days after the start of commercial operation. The Provisional Closure Plan and Cost Estimate shall consider applicable final closure plan requirements, including interim and long-term, post-closure site maintenance costs, and reflect:

1. facility closure costs at a time in the facility's projected life span when the mode and scope of facility operation would make permanent closure the most expensive;
2. the use of an independent third party to carry out the permanent closure; and
3. no use of salvage value to offset closure costs.

The Provisional Closure Plan and Cost Estimate shall provide for a phased closure process and include but not be limited to:

1. comprehensive scope of work and itemized budget;
2. closure plan development costs;
3. dismantling and demolition;
4. recycling and site clean-up;
5. mitigation and monitoring direct, indirect, and cumulative impacts;
6. site remediation and/or restoration;
7. interim operation and post-closure monitoring and maintenance, including long-term equipment replacement costs; and
8. contingencies.

The project owner shall include an updated Provisional Closure Plan and Cost Estimate in every fifth-year ACR for CPM review and approval. Each

updated Provisional Closure Plan and Cost Estimate shall reflect the most current regulatory standards, best management practices, and applicable LORS.

B. Final Closure Plan and Cost Estimate
At least three (3) years prior to initiating a permanent facility closure, the project owner shall submit for Energy Commission review and approval, a Final Closure Plan and Cost Estimate, which includes any long-term, post-closure site maintenance and monitoring. Final Closure Plan and Cost Estimate contents include, but are not limited to:

1. **a statement of specific Final Closure Plan objectives;**
2. **a statement of qualifications and resumes of the technical experts proposed to conduct the closure activities, with detailed descriptions of previous power plant closure experience;**
3. **identification of any facility-related installations not part of the Energy Commission certification, designation of who is responsible for these, and an explanation of what will be done with them after closure;**
4. **a comprehensive scope of work and itemized budget for permanent plant closure and long-term site maintenance activities, with a description and explanation of methods to be used, broken down by phases, including, but not limited to:**
   a. **dismantling and demolition;**
   b. **recycling and site clean-up;**
   c. **impact mitigation and monitoring;**
   d. **site remediation and/or restoration;**
   e. **post-closure maintenance; and**
   f. **contingencies.**
5. **a revised/updated Final Cost Estimate for all closure activities, by phases, including long-term, post-closure site monitoring and maintenance costs, and replacement of long-term post-closure equipment;**
6. **a schedule projecting all phases of closure activities for the power plant site and all appurtenances constructed as part of the Energy Commission-certified project;**
7. **an electronic submittal package of all relevant plans, drawings, risk assessments, and maintenance schedules and/or reports, including an above- and below-ground infrastructure inventory map and registered engineer's or delegate CBO's assessment of demolishing the facility; additionally, for any facility that permanently ceased operation prior to submitting a Final Closure Plan and Cost Estimate and for which only minimal or no maintenance has been done since, a comprehensive condition report focused on identifying potential hazards;**

8. <u>all information additionally required by the facility's conditions of certification applicable to plant closure;</u>

9. <u>an equipment disposition plan, including:</u>

   a. <u>recycling and disposal methods for equipment and materials; and</u>

   b. <u>identification and justification for any equipment and materials that will remain on-site after closure;</u>

10. <u>a site disposition plan, including but not limited to:</u>

    a. <u>proposed rehabilitation, restoration, and/or remediation procedures, as required by the conditions of certification and applicable LORS,</u>

    b. <u>long-term site maintenance activities, and</u>

    c. <u>anticipated future land-use options after closure;</u>

11. <u>identification and assessment of all potential direct, indirect, and cumulative impacts and proposal of mitigation measures to reduce significant adverse impacts to a less-than-significant level; potential impacts to be considered shall include, but not be limited to:</u>

    a. <u>traffic</u>

    b. <u>noise and vibration</u>

    c. <u>soil erosion</u>

    d. <u>air quality degradation</u>

    e. <u>solid waste</u>

    f. <u>hazardous materials</u>

    g. <u>waste water discharges</u>

    h. <u>contaminated soil</u>

12. <u>identification of all current conditions of certification, LORS, federal, state, regional, and local planning efforts applicable to the facility, and proposed strategies for achieving and maintaining compliance during closure;</u>

13. <u>updated mailing list or listserv of all responsible agencies, potentially interested parties, and property owners within one (1) mile of the facility;</u>

14. <u>identification of alternatives to plant closure and assessment of the feasibility and environmental impacts of these; and</u>

15. <u>description of and schedule for security measures and safe shutdown of all non-critical equipment and removal of hazardous materials and waste (see conditions of certification for Public Health, Solid Waste Management, Hazardous Materials Management, and Worker Safety).</u>

<u>If an Energy Commission-approved Final Closure Plan and Cost Estimate is not implemented within one (1) year of its approval date, it shall be</u>

updated and re-submitted to the Commission for supplementary review and approval. If a project owner initiates but then suspends closure activities, and the suspension continues for longer than one (1) year, or subsequently abandons the facility, the Energy Commission may access the required financial assurance funds to complete the closure. The project owner remains liable for all costs of contingency planning and 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.~~

KEY EVENTS LIST

PROJECT: ______________________________

DOCKET #: ______________________________

COMPLIANCE PROJECT MANAGER: ______________________________

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
On-line Date	
POWER PLANT SITE ACTIVITIES	________________
Start Site Assessment/Pre-construction	
Start Site Mobilization/Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	________________
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	________________
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	________________
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

COMPLIANCE TABLE 1: SUMMARY OF COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COM-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COM-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.
COM-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.
COM-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: • Notify property owners • Submit pre-construction matrix identifying conditions to be fulfilled before the start of construction • Completed all pre-construction conditions • CPM has issued a letter to the project owner authorizing construction
COM-5	Compliance Matrix	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and Annual Compliance Report, which includes the status of all Compliance Conditions of Certification.
COM-6	Monthly Compliance Report/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.
COM-7	Annual Compliance Report	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.

COMPLIANCE TABLE 1
SUMMARY OF COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COM-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.
COM-9	Annual Energy Facility Compliance Fees	Payment of Annual Energy Facility Compliance Fee
COM-10	Amendments, Ownership Changes, Staff-Approved Project Modifications, and Verification Changes	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 or operational control of the facility.
COM-11	Reporting of Complaints, Notices, and Citations	Prior to the start of construction, the project owner must provide all property owners within a one (1) mile radius a telephone number to contact project representatives with questions, complaints or concerns. Within ten (10) days of receipt, the project owner shall report to the CPM all notices, complaints, violations, and citations.
COM-12	Site Contingency Planning	No less than sixty (60) days prior to the start of commercial operation the project owner must submit an on-site contingency plan to ensure public and environmental health and safety are protected while responding to an unanticipated event or emergency.
COM-13	Incident Reporting Requirements	The project owner shall notify the CPM within one (1) hour of an incident and submit a detailed incident report within thirty (thirty) days, maintain records of incident report, and submit public health and safety documents with employee training provisions.
COM-14	Non-Operation	No later than two (2) weeks prior to a facility’s planned non-operation, or no later than two (2) weeks after the start of unplanned non-operation, the project owner must notify the CPM, interested agencies and nearby property owners of this status. During non-operation, the project owner must provide written updates.

COMPLIANCE TABLE 1:
SUMMARY OF COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COM-15	Facility Closure Plans	One (1) year after initiating commercial operation, the project owner must submit a Provisional Closure Plan and Cost Estimate for permanent closure. Three (3) years prior to closing, the project owner must submit a Final Closure Plan

ATTACHMENT A
COMPLAINT REPORT and 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 COMPLAINANT CONTACTED TO DISCUSS FINDINGS:____________________

DESCRIPTION OF CORRECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION:____________________

DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION? ☐ YES ☐ NO

IF NOT, EXPLAIN:____

CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED:____________________

DATE FIRST LETTER SENT TO COMPLAINANT (COPY ATTACHED):____________________

DATE FINAL LETTER SENT TO COMPLAINANT (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)

Declarations and Resumes

DECLARATION OF
Abdel-Karim Abulaban, P.E.

I, Abdel-Karim Abulaban, hereby declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering section** of the Siting, Transmission and Environmental Protection Division as an **Associate Civil 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 on **Soil and Water Resources**, for the **Blythe Solar Power Project (09-AFC-6C)** 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: 9/19/2013 Signed: [signature]

At: Sacramento, California

AbdelKarim Abulaban
5501 Lilyview Way, Elk Grove, CA 95757
Tel. (916) 233-5006 (Mobile)
e-mail: akabulaban@aim.com

Education

Ph.D. Civil Engineering, University of Minnesota (*Hydrology and Water Resources).*
Thesis title: Modeling the transport of sorbing chemicals in heterogeneous porous media.
M.S. Civil Engineering, Yarmouk University, Irbid, Jordan *(Water Resources).*
Thesis Title: Developing Intensity-Duration-Frequency Curves for Irbid Region.
B.S. Civil Engineering, Yarmouk University, Irbid, Jordan *(water resources stream).*
Senior Project: Design of Water Supply and Sewer Systems for the Northwestern Part of Irbid City (*population 100,000).*

Registration:

Registered Professional Engineer (Civil) in the state of California (Lic. No. 76030)
Registered as a Qualified SWPPP Developer and Practitioner (QSD/QSP), California Stormwater Quality Association (CASQA) - Cert. # 1160.

Experience - Professional

June 2010-Present: ***Associate Civil Engineer*** CA Energy Commission, Sacramento, CA, USA.	❖ Reviewing and evaluating the construction, operation, and maintenance of energy facilities and power plants for water supply, wastewater disposal, waste, water quality, and stormwater to assess the potential impacts to human health and the environment. ❖ Reviewing sensitive project sites that may have issues involoving flooding and stormwater management, discharges to impaired water bodies, depleted groundwater and surface water resources, and wastewater management and disposal methods. ❖ Responding to soils or water resources issues that may arise regarding power plant operations. ❖ Conducting investigations to determine if any violations of the program's regulations, the Energy Commission's conditions of certification, or the CA Environmental Quality Act (CEQA) have occurred. ❖ Analysis of one of the largest solar projects in the world for environmental impacts on soil and water resources. This project is designed to generate 500 megawatts using solar energy to generate steam that runs a turbine to generate electricity. ❖ Analysis of another solar project, also one of the largest projects in the world, that uses photovoltaic (PV) technology and is designed to generate 1000 megawatts. ❖ Currently analyzing a cutting-edge project that proposes to minimize the green house impact of the project by injecting the generated CO2 gas underground for long term sequestration. The CO2 would be injected to depths of 5000 ft. or more below ground surface. This project is the first of its kind in the USA and would set the stage for other projects to store CO2 in geologic formations to reduce green house gas emissions.
Dec. 2006-May 2010:	❖ In charge of hydraulic modeling and sediment transport for the

Water Resources Engineer CA Dept. Water Resources, Fresno, CA, USA.	San Joaquin River restoration project. ❖ Performed 1- and 2-D hydraulic analysis to support restoration of the San Joaquin River for the purpose of improving spawning/rearing habitat, enhancing floodplain connectivity, and improving riparian corridor.
Dec. 2001-Dec. 2006: **Retained Hydrologist** J.L. Nieber & Associates, Hydrologic Consultants, Lindstrom, Minnesota, USA.	❖ Performed hydrologic analysis and assessment of environmental impact of comtamination incidents on ground water resources, as well as design of remediation plans. ❖ Contaminants analyzed included hydro-carbons, chlorinated solvents, as well as agrichemicals.
Dec. 90 – Dec. 93: **Retained Hydrologist**. BAUMGARTNER ENVIRONICS, INC, Olivia, Minnesota, USA.	❖ Performed assessment of the environmental impact of contamination incidents on groundwater resources, and design of action plans.
Jun. 84 - Sep. 84: **Civil Engineer** WESTON International, Inc, Irbid Wastewater Treatment Facility, Irbid, Jordan.	❖ Conducted material quality control, performing both laboratory and field quality control tests.

Experience - Teaching

Sep. 2003-Sep. 2005: Assistant Professor, Hashemite University, Zarqa, Jordan.	Taught the following courses: ❖ Water and Wastewater Treatment Mehods (Senior) – 1 semester ❖ Wastewater Engineering (Senior level) – 2 semesters ❖ Statics - 3 semesters ❖ Engineering Drawing - 4 semesters ❖ Visual Communication - 4 semesters
June – August, 96, 97, 98, 2000: Army High Performance Computing Research Center, Minneapolis, Minnesota.	❖ The Summer Institute is a summer course offered to promising upper class students from member institutions. The summer course included a ground water flow and transport group that normally had about 4 students from different backgrounds. ❖ Taught and helped teach the Summer Insitute course in hydrology and transport in porous media. ❖ Was part of the team that trained the students to use a particle tracking solute transport code which I developed. ❖ Also trained the group to use the DoD's Ground Water Modeling System, GMS. ❖ In the summer of 2000 I was fully in charge of the whole group. ❖ More infromation about the projects can be on the Summer Institute web site at: http://www.arc.umn.edu/education/SummerInst/
August, 1997: Short course for practitioners, University of Minnesota, Minneapolis, Minnesota, USA.	❖ Taught a short course on the application of the Department of Defense's Ground Water Modeling System, GMS, offered by the American Society of Agricultural Engineers and attended by about 40 professionals and academicians from around the United States as well as several countries around the world.

Mar. 88 - Dec. 92: Teaching Assistant, Dept. of Civil Engineering, University of Minnesota, Minneapolis, Minnesota.	❖ Teaching assistant for the senior courses of Hydrology and Hydrologic Design, and Water Resources Engineering.
Sep. 84 - Sep. 86: Teaching Assistant, Civil Engineering Dept., Yarmouk University, Irbid, Jordan.	❖ Teaching assistant for the courses of Statics, Engineering Graphics, Fluid Mechanics, Hydraulics, Sanitary Engineering, Applied Hydraulics, and Groundwater Hydrology.
Jan. 87 - Jun. 87: Instructor, Institute of Allied Health Sciences, Irbid, Jordan.	❖ Teaching a senior level course on the principles of environmental engineering.

DECLARATION OF
Michael C. Baron

I, Michael C. Baron

1. I am presently employed by the California Energy Commission in the **Land Use Section** of the Siting, Transmission and Environmental Protection Division as a Planner II with an expertise in Land Use.

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 **Land Use,** for the **Blythe 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 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: 9/16/2013 Signed: ______________

At: Sacramento, California

Michael C. Baron

Professional experience

2013-Present California Energy Commission Sacramento, CA

Planner II - Siting Transmission and Environmental Protection

- Technical Writing
- Prepare and Analyze Land Use Sections, Conditions of Approval, Findings and CEQA Documentation
- Energy Policy Analysis
- Perform Site Inspections

2011-2013 Caldwell Compliance Pleasanton, CA

Regulatory Analyst

- Audit Existing Leased/Owned ATT Cell Tower Facilities for NEPA, SHPO, FAA, & FCC Compliance
- Analyze 1A/2C surveys, 620/621 SHPO submittals, NEPA reports, Phase I ESA, Tribal Notification System (TCNS), RF/Spectrum, Programmatic Agreement Letters (PAL)
- Verify Tower Height (HV), Marking and Lighting (M&L)
- Update and Upload Compliance Documentation within AT&T Internal Tracking Systems using Internal Software. i.e. ANGELS, Guardian, and Siterra
- FAA/FCC Database searches using notice Criteria Tool, TOWAIR Circle Search, and ASR Registration Search
- Sitesafe AM Tower Screening
- Work from Remote Station
- Use Microsoft Outlook, Word, Excel
- Participate/Lead in regulatory status meeting and conference calls

2004-2010 El Dorado County Planning Services Placerville, CA

Senior Planner

- Intake and Process Subdivision Maps, Planned Developments Commercial Design Reviews, Proposed Utility Projects, Variances, DEIR preparation, and Land Use Permits
- Develop Mitigation and Monitoring Programs
- Coordinate Site Improvements/Modifications with Utility Companies
- Front Counter Customer Service/Public Assistance
- Meeting Facilitation
- Prepare and Analyze Staff Reports, Conditions of Approval, Findings and CEQA Documentation
- Present Findings and Make Recommendations to Boards and Commissions
- Plan Review for Ordinances and General Plan Consistency
- Proficient Using Arcview, Arc Map, and Arc Catalog for GIS Long Range Planning Support and Exhibits
- Perform Site Inspections=

2003-2004 BAP Construction Westmont, IL

Supervisor/Crew Leader

- Estimating Construction Costs
- Construction Management
- Interpret and Analyze Proposed Construction Plans
- Responsible for Permit Processing and Approvals
- Supervise and Assign Daily Tasks
- Scheduling and Tracking Project Milestones

2000-2002 SIUC Geography Department Carbondale, IL

Teaching Assistant- Weather Forecasting

- Guide Students Through Laboratory Experiments
- Assist Students During Office Hours
- Proctor Exams
- Grade All Homework and Exams

1999-2000 Southern 5 County Planning Commission Ullin, IL

GIS/Cartographic Assistant

- Develop and Layout Spatial Datasets using Arcview/ArcInfo
- Created, Maintained and Managed Road and Utility Database for Five Counties
- Present Data and Findings to Supervisors, Boards, and Commissions
- Perform Site Inspections
- Public Assistance

Education

1999-2003 Southern Illinois University Carbondale, IL

Master of Science, Geography

- Urban/Environmental Planning
- Quantitative Research Methods
- Socio-Cultural Research
- Sustainable Development Practices
- Alternative Energy Resources
- GIS/Cartographic Applications
- Disaster Planning
- Parks and Wild Lands Management

1996-1999 Southern Illinois University Carbondale, IL

Bachelor of Arts, Geography

- Urban/Environmental Planning
- GIS/Cartographic Applications
- Natural Resources Planning
- U.S. Environmental Policies Analysis
- Sustainable Development
- Socio-Economics

DECLARATION OF
Edward Brady

I, **Edward Brady**:

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 helped prepare the staff testimony on **Power Plant Efficiency and Power Plant Reliability**, for the **Blythe 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 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: 9/19/2013 Signed: Edward Brady

At: Sacramento, California

Edward James Brady
Mechanical Engineer

Summary of Experience

Forty years of experience in the profession of mechanical engineering as a staff engineer to the California Energy Commission, engineering consultant, design group supervisor in a major power plant project, senior engineer for a gas and electric utility, sales and design engineer for a contractor, and instructor in a community college.

Education

- BSME, Santa Clara University, 1972
- Graduate Engineering Studies, Santa Clara University
- Graduate Business Studies, University of San Francisco
- Continuing Education, UC Extension

Professional Registration

- Mechanical Engineer (M17924) California
(25505) Washington
(33082) Colorado
(9248, Inactive) Nevada

- Civil Engineer (C36194) California

Affiliations

- American Society of Mechanical Engineers (ASME), Member
- American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), Member
- International Code Council (ICC), Member
- International Association of Plumbing and Mechanical Officials (IAPMO), Member
- National Fire Protection Association (NFPA), Member

Curriculum Vitae

2011 – Present	**Staff Mechanical Engineer**, California Energy Commission, Siting, Transmission, and Environmental Protection Division (STEP). Performs analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil, electrical, and structural aspects of power plant siting and construction cases.
1988-2011	**Principal Mechanical Engineer,** Brady Engineering. Provided design and consulting services for the permitting and construction of industrial and commercial facilities, and residential buildings in the fields of heating, ventilating air conditioning (HVAC), plumbing, fire protection and energy analyses.
1984-1988	**Design Group Supervisor,** Joint PG&E and Bechtel Project. Worked as the mechanical group supervisor responsible for the design modifications required for the licensing of Diablo Canyon Power Plant, Units 1 and 2.
1980-1988	**Senior Mechanical Engineer,** PG&E Civil Engineering Department, Architectural Section. Provided work group supervision and design of building mechanical systems for common utility plant facilities (CUP) and balance of plant systems for power production facilities.
1977-1980	**Mechanical Engineer,** PG&E Civil Engineering Department, Architectural Section. Provided HVAC and plumbing design for CUP and power production facilities.
1974-1977	**Instructor,** San Francisco Community College District, John O'Connell Evening School. Provided apprenticeship training in the technical fields of HVAC and refrigeration.
1977	**Design Engineer,** Charles and Braun Consulting Engineers, San Francisco. Worked as a staff designer in the fields of HVAC and plumbing for commercials facilities include a sentence detention facilities and a proto-type regional facility for a federal agency.
1972-1976	**Sales and Design Engineer,** Scatena York Company, San Francisco. Worked as a sales and design engineer for a refrigeration contractor, which provided design and installation of refrigeration systems for supermarkets and cold storage facilities.

Power Plant/Utility Experience

California Energy Commission, Rio Mesa Solar Electric Generation Station (RMSEGS). 500 MW Solar Power Tower. Riverside County

, Hidden Hills Solar Electric Generating Station (HHSEGS). 500 MW Solar Power Tower. Inyo County.

, Hydrogen Energy California (HECA). 405 MW Combined Cycle, Fuel Gasification, CO_2 Sequestration, Ammonia Production. Kern County

, Quail Brush Generating Project (QBGP). 1100 MW Reciprocating Engine Electric Generation. City of San Diego

, Huntington Beach Energy Project (HBEP). 939 MW Combined Cycle. City of Huntington Beach.

, Redondo Beach Energy Project (RBEP). 496 MW Combined Cycle. City of Redondo Beach, Los Angeles County.

PG&E , Diablo Canyon Power Plant, Units 1 and 2. Licensing of safety related systems.
, Diablo Canyon Power Plant, Administration Building, SLO County Emergency Response Building

, Geysers Power Plant, Units 16, 17, 20, and 21. Ventilation and cooling for turbine building and hazardous waste disposal facilities, administration building.

, Helms Pumped Storage Facility, Kern County. Smoke control ventilation for underground transformer vaults.

, Humboldt No. 3, Eureka. Decommissioning of nuclear facility and construction of hazardous materials storage and handling.

, Moss Landing Power Plants, Units 1 through 6, Monterey County

, Morro Bay Power Plant, Morro Bay

, Hunters Point Power Plant, San Francisco

, Potrero Power Plant, San Francisco. Combined Cycle

, Gas Transmission Facilities, Line 300 and 400, Topock and Corning Compressor Stations, McDonald Island and Brentwood Gas Storage Facilities

, Central Computer Facilities, San Francisco and Vacaville

, 77 Beale Street, San Francisco. Energy Management System

, 215 Market Street, San Francisco. Boiler Replacement

, Underground Fuel Tank Replacement. Upgrade of more than 500 gallon fuel storage tanks to meet double containment requirements.

, Contra Costa Power Plants, Unit 1 through 6, Water Treatment

, Pittsburg Power Plants, Unit 1-5, Water Treatment Facilities

, Avon, Martinez and Oleum (AVO), Water Treatment Upgrade

, Tiger Creek Powerhouse, North Fork Feather River

, Kirchoff No. 2 Pump Storage Facility.

, Technical Support Services, Marketing Department

South Bay Sanitary Authority, 1400 Radio Road, Redwood Shores. Gas piping and boiler conversion.

DECLARATION OF
Huei-An (Ann) Chu

I, **Huei-An (Ann) Chu**:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting, Transmission and Environmental Protection Division as an **Air Resources Engineer** of **Public Health.**

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 **Public Health** and **Alternatives**, for the **Blythe 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 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: 9/19/2013 Signed: Huei-An Chu

At: Sacramento, California

Huei-An (Ann) Chu

1600 Tamarack Ln, Davis, CA 95616
Phone: 530-899-9604, Email: Ann.Chu@energy.ca.gov
Citizenship Status: Green Card

EDUCATION

PhD, Environmental Sciences and Engineering, 05/2006
School of Public Health, University of North Carolina at Chapel Hill
Area of Specialization: Environmental Risk Assessment, Environmental Management and Policy, Risk-Based Regulation, Biostatistics, Environmental Epidemiology

MEM, Environmental Management, 05/2000
School of Forestry and Environmental Studies, Yale University, New Haven, CT

MS, Environmental Engineering, 06/1998
National Taiwan University, Taipei, Taiwan

BA, Geography, with honors, 06/1996
National Taiwan University, Taipei, Taiwan

SKILLS

Language: Fluent in Chinese and English.

Computer software and programming skills: HARP, SAS, Stata, Minitab, ArcGIS, ArcView, ArcInfo, Stella, Crystal Ball, ISC, ERMapper, Microsoft Excel, PowerPoint, Word.

WORK EXPERIENCE

Air Resources Engineer, California Energy Commission, 1/12/2012 - Present
- Independently performs responsible, varied analyses assessing air quality and public health impacts of energy resource use and large electric power generation projects in California.
- Model air quality and public health impacts of stationary sources using HARP (Hot Spot Analysis and Reporting Program).
- Identify air quality and public health impacts of stationary sources and measures to mitigate these impacts following California Environmental Quality Act and regulations of US EPA (including the National Environmental Policy Act), ARB, and the Districts.
- Collect, analyze, and evaluate data on the effects of air pollutants and power plant emissions on human health, and the environment.
- Ensure conditions of certification are met and recommending enforcement actions for violations.

Research Associate, Taiwan Development Institute, 10/01/2010 – 12/31/2011
- Provided professional consultation for the environmental risk assessment of Taiwan's techno-industrial development initiatives
- Reviewed the environmental risk assessment reports of Taiwan's techno-industrial development initiatives
- Presented in various distinguished lecturer series about environmental risk assessment

Consultant, Chu Consulting, 08/2007 - 07/2010
- Conducted a cumulative risk assessment to evaluate the risk associated with the emissions of VOCs from a petrochemical plants in southern Taiwan
- Used EPA's ISC3 model (based on Gaussian dispersion model) to simulate the dispersion and deposition of VOCs from this petrochemical plant to the neighboring areas, then used ArcGIS to spatially combine the population data and VOC simulation data (and further calculated risks)

- Built a framework of risk-based decision making to set the emission levels of VOCs to reduce people's exposure and the risk of experiencing health problems
- Presented in conference: SRA 2007
- Awarded: CSU-Chico BBS Faculty Travel Funds (2007)

Environmental Justice Intern, Clean Water for North Carolina (CWFNC), Summer, 2005
- Reviewed and critiqued key state environmental policies and the federal EPA Public Participation Policy.
- Interviewed impacted communities, member organizations of the NC Environmental Justice Network, state policy officials about how those policies are actually implemented.
- Wrote a report about the survey and review of environmental justice needs for key state policies.
- Report Publication: "Achieving Environmental Justice in North Carolina Public Participation Policy" (Aug, 2005).

Volunteer, New Haven Recycles and Yale Recycling, 08/1998 – 05/2000
- Promoted recycling and conservation
- Checked trash cans (chosen randomly) and recycling bins at each entryway of residential college, then gave grades.

Volunteer, Urban Resource Initiative (URI), Summer, 1998
- Planted trees for local community of New Haven for a better and sustainable environment

RESEARCH EXPERIENCE

Postdoctoral Research

Department of Public Health Sciences, University of California, Davis, 07/01/2010 - present
Research advisor: Dr. Deborah H. Bennett and Dr. Irva Hertz-Picciotto
- Work on two projects: NIEHS-funded ***Childhood Autism Risks from Genetics and Environment (CHARGE)*** and EPA-funded ***Study of Use of Products and Exposure Related Behavior (SUPERB)***.
- Perform statistical and quantitative analyses with SAS to analyze collected house dust data and children's urine concentrations of metabolites.
- Conduct exposure assessment to investigate if pesticides, flame retardants, and phthalates are risk factors for children autism.
- Conduct exposure assessment to explore the relationships between children's exposure to phthalate, benzophenone-3 (oxybenzone), triclosan, and parabens, and the use of personal care products.
- Produce scholarly peer-reviewed publications of methodology and findings, and write the final reports of both projects.

Carolina Environmental Program, University of North Carolina at Chapel Hill, 01/01/2006 – 12/31/2006
Research advisor: Dr. Douglas J. Crawford-Brown
- Applied a framework of risk-based decision-making to perchlorate in drinking water. (Awarded: SRA Annual Meeting Travel Award 2006)
- Conducted a material and energy flow analysis (MEFA) to quantify the overall environmental impact of Bank of America operations, and quantitatively analyze the strategies BOA might adopt to reduce these impacts and achieve sustainability. (Report Publication: "Environmental Footprint Assessment")

Doctoral Research, 08/2000-12/2005

Department of Environmental Sciences and Engineering, School of Public Health, University of North Carolina at Chapel Hill
Research advisor: Dr. Douglas J. Crawford-Brown
- Dissertation topic: "**A framework of Risk-Based Decision Making by Characterizing Variability and Uncertainty Probabilistically: Using Arsenic in Drinking Water as an Example**".
- Conducted risk assessment for arsenic in drinking water.
- Conducted theoretical analysis on the variability and uncertainty issues of risk assessment.

- Conducted a meta-analysis to improve dose-response assessment.
- Conducted analytical and numerical analysis to build a new framework of risk-based decision-making which can be applied coherently across the regulation decisions for different contaminants.
- Presented in conferences: APPAM (2004), SRA (2004, 2005 and 2006), DESE Seminar (2005), CEP Symposium on Safe Drinking Water (2006).
- Awarded: SRA Annual Meeting Student Travel Award (2004 & 2005), UNC-CH Graduate School Travel Grants (2004), UCIS Doctoral Research Travel Awards (2002).

Master's Research

School of Forestry and Environmental Studies, Yale University, 08/1999 - 06/2000
Research advisor: Dr. Xuhui Lee

- Master's project: **"Forest Stand Dynamics and Carbon Cycle**".
- Research project: "Monitoring Forest CO_2 Uptaking"
- Used remote sensing (ERMapper) to investigate the role of forest in the uptake of CO_2.
- Awarded from Teresa Heinz Scholars for Environmental Research Program (2000) and Klemme Award (1999).

Graduate Institute of Environmental Engineering, National Taiwan University, 06/1996 - 06/1998
Research advisor: Dr. Shang-Lien Loh

- Master's thesis: **"The Loads of Air Pollutants from Urban Areas on a Neighboring Dam and its Water Quality**"
- Research Projects: "Research on Air Pollutant Deposition in Urban Areas" and "the Fate and Flow of Recyclable Materials"
- Used Gaussian's Dispersion model (ISC3) to investigate the loads of air pollutants on dam water.

TEACHING EXPERIENCE

Lecturer

Department of Environmental Studies, California State University at Sacramento

- Environmental Politics and Policy, Fall 2011

Department of Geological & Environmental Science, California State University at Chico

- Environmental Risk Assessment, Spring 2009 & 2010
- Applied Ecology, Spring 2008
- Pollution Ecology, Fall, 2007

Department of Geography & Planning, California State University at Chico

- Seminar in Applied Geography & Planning – Environmental Regulation and Policy, Fall, 2007

Department of Forestry and Environmental Resources, North Carolina State University

- Environmental Regulation, Fall, 2006

Teaching Assistant

Department of Environmental Sciences and Engineering, UNC-Chapel Hill

- Environmental Risk Assessment, Spring, 2002
- Introduction to Environmental Science, Fall, 2001
- Analysis and Solution of Environmental Problems, Fall, 2001

Lab Instructor

Department of Environmental Sciences and Engineering, UNC-Chapel Hill

- Biology for Environmental Science, Fall, 2000

Graduate Institute of Environmental Engineering, National Taiwan University

- Water Quality Analysis, Fall, 1997

AWARDS and HONORS

- CSU-Chico BBS Faculty Travel Funds, 2007
- Member of Society of Risk Analysis (SRA), 2006-2008
- SRA Annual Meeting Student Travel Award, 2004-2006
- UNC-CH Graduate School Travel Grants, 2004
- Member of Association for Public Policy Analysis and Management (APPAM), 2004-2005
- UCIS Doctoral Research Travel Awards, 2002
- Graduate Student Teaching and Research Assistantships, 2000-2005
- Teresa Heinz Scholars for Environmental Research Program, 2000
- Yale Forestry & Environmental Studies, Klemme Award, 1999

PUBLICATIONS (SELECTED LIST)

Huei-An Chu, Deborah H. Bennett, Irva Hertz-Picciotto, "Phthalates in relation to autism and developmental delay: Exploratory analyses from the CHARGE Study". (In preparation)

Huei-An Chu, Deborah H. Bennett, Irva Hertz-Picciotto, "Peronal Care Products: Possible Sources of Children Phthalate Exposure". (In preparation)

Huei-An Chu and Douglas J. Crawford-Brown, "A Probabilistic Risk Assessment Framework to Quantify the Protectiveness of Alternative MCLs for Arsenic in Drinking Water", *Journal of American Water Works Association*. (Being revised)

Huei-An Chu and Douglas J. Crawford-Brown, "Letter to the Editor: Inorganic Arsenic in Drinking Water and Bladder Cancer: A Meta-Analysis in Dose-Response Assessment", *International Journal of Environmental Research and Public Health*, 2007, 4(4), 340-341.

Huei-An Chu and Douglas J. Crawford-Brown, "Inorganic Arsenic in Drinking Water and Bladder Cancer: A Meta-Analysis in Dose-Response Assessment", *International Journal of Environmental Research and Public Health* 2006, 3(4), 316-322.

S.L. Lo and **H.A. Chu**, "Evaluation of Atmospheric Deposition of Nitrogen to the Feitsui Reservoir in Taipei", *Water Science & Technology*, 2006, 53(2), 337-344.

CSE Consulting and the UNC Carolina Environmental Program (CEP), "Environmental Footprint Assessment", Report for Bank of America, Aug, 2006.

Huei-An Chu, "Achieving Environmental Justice in North Carolina Public Participation Policy", Report for Clean Water for North Carolina (CWFNC), Aug, 2005.

Huei-An Chu, "Arsenic and its Health Implications", Report for University Center for International Studies Graduate Travel Awards, 2002.

PRESENTATIONS (SELECTED LIST)

Guest Speaker, "Human Health Risk Assessment – Arsenic in Drinking Water as an Example". Tunghai University, Taichuang, Taiwan. (December 16th, 2010)

Guest Speaker, "Environmental Problems in Developing Countries", Course Title: Developing Countries, Department of Economics, CSU-Chico (October 31st, 2008)

"Cumulative Risk Assessment for Volatile Organic Compounds (VOCs) from Petrochemical Plants in Southern Taiwan". Oral Presentation in Society of Risk Analysis (SRA) 2007 Annual Meeting, San Antonio, TX. (December, 2007)

Guest Speaker, "Arsenic in Drinking Water", Course Title: Environmental Geology, CSU-Chico. (November 13th, 2007)

"Risk-Based Environmental Regulation for Arsenic in Drinking Water", Oral Presentation in Department of Environmental Health Seminar, East Tennessee State University (February 2nd, 2007)

"A Framework of Risk-based Decision Making by Characterizing Variability and Uncertainty Probabilistically: Using Arsenic in Dinking Water as an Example", Oral Presentation in Society of Risk Analysis (SRA) 2006 Annual Meeting, Baltimore. MD. (December, 2006)

"A New Policy Tool to Choose Water Quality Goals under Uncertainty", Poster Presentation in Society of Risk Analysis (SRA) 2006 Annual Meeting, Baltimore. MD. (December, 2006)

"A framework of Risk-Based Decision Making by Characterizing Variability and Uncertainty Probabilistically: Using Arsenic in Drinking Water as an Example", Oral Presentation for National Center for Environmental Assessment (NCEA), Environmental Protection Agency (EAP). (October 26th, 2006)

"Probabilistic Risk Assessment for Arsenic in Drinking Water", Poster Presentation in Carolina Environmental Program (CEP) 2006 Symposium on Safe Drinking Water, Chapel Hill, NC. (March, 2006)

"Probabilistic Risk and Margins of Safety for Water Borne Arsenic", Poster Platform Presentation in Society of Risk Analysis (SRA) 2005 Annual Meeting, Orlando, FL. (December, 2005)

"Using Meta-Analysis in Dose-Response Analysis – Risk Assessment of Arsenic in Drinking Water as an Example", Poster Platform Presentation in Society of Risk Analysis (SRA) 2004 Annual Meeting, Palm Springs, CA. (December, 2004)

DECLARATION OF
Christopher Dennis, P.G., CHG

I, **Christopher Dennis**, declare as follows:

1. I am presently employed by the California Energy Commission for the in the Environmental Office of the Siting, Transmission and Environmental Protection Division as an Engineering Geologist.

2. My professional qualifications and experience are attached hereto and incorporated by reference herein.

3. I helped prepare the Staff Testimony on **Waste Management** for the Blythe 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 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: September 16, 2013 Signed: CB D

At: Sacramento, California

CHRISTOPHER DENNIS, PG, CHG

EXPERIENCE SUMMARY

Mr. Dennis is a licensed Professional Geologist and Certified Hydrogeologist with the State of California, and a California Qualified Stormwater Practioner/Developer. Mr. Dennis has over 20 years of professional technical and management experience. Fourteen of those years, he worked in private industry as a consultant. For the last six years, he has worked in the Energy Commissions Siting, Transmission and Environmental Protection Division. Mr. Dennis has been a portfolio manager for several major oil companies and the East Bay Municipal Utility District. He actively managed Unocal CERT, ExxonMobil, and ChevronTexaco pipeline, service station, bulk fueling, and terminal sites.

EDUCATION/REGISTRATION/CERTIFICATIONS

Pepperdine Law School, Certificate in Dispute Resolution, 1997
Whittier College of Law, J.D., 1996
California State University, Fullerton, B.S. Geology, 1989
Certified Hydrogeologist, State of California #963
Professional Geologist, State of California #7184
Qualified Stormwater Practioner/Developer #767
OSHA-SARA 40-Hour Hazardous Waste Activity Training 29 CFR 1910.120

PROFESSIONAL HISTORY

2007 to Current California Energy Commission, Engineering Geologist
2004 to 2007 Science Applications International Corporation, Senior Geologist
2004 to 2004 Bay Consulting Services, LLC, Principal
2001 to 2004 Cambria Environmental Technology, Inc., Office Manager, Senior Geologist
2000 to 2001 Alisto Engineering, Inc, Senior Geologist
1998 to 2000 Alton Geoscience-TRC, Inc., Senior Geologist
1993 to 1995 GeoResearch, Inc., Project Manager
1990 to 1993 AeroVironment, Inc., Staff Geologist
1989 to 1990 Applied Geosciences, Inc., Technician

2007 to Current, California Energy Commission, Sacramento, CA
Engineering Geologist
Siting, Transmission, and Environmental Protection Division

One of the primary functions of the Energy Commission is CEQA review of license applications to build and operate power plants 50 MW and greater in California. In the Energy Commission's Engineering Office, Mr. Dennis helps fulfill this function by working through and managing a wide variety of CEQA and environmental policy issues. The product of this effort is expressed in expert testimony and staff analysis for siting new power plants and power plant compliance activity. His testimony and analyses cover soil and water resource management, waste management, geological hazards, and paleontological resource management. He participates as a technical speaker at public workshops as needed.

He has worked on simple-cycle, combined cycle, cogeneration, geothermal, and large-scale thermal solar power plants, and is familiar with most of the major power plants in construction and operation in California today. He has conducted construction and operation compliance inspections at many of these plants. Mr. Dennis also works on the Energy Commission's water policy, having help bring it to the foreground with his final staff assessment for the Abengoa Solar project license. When issues involving Energy Commission or state policy, Mr. Dennis participates in meetings with his deputy director where he provides input on his assessments and recommendations.

A list of power plant siting cases for which he has authored assessments, in whole or in part follows: Abengoa Solar (Solar Thermal), Chevron USA (Natural Gas), CPV Sentinel (Natural Gas), Imperial Solar

(Solar Thermal), Ivanpah SEGS (Solar Thermal), Palmdale Hybrid (Natural Gas-Solar Thermal), Quail Brush (Natural Gas), Rio Mesa SEGF (Solar Thermal), and San Joaquin Solar (Solar Thermal-Biomass). Mr. Dennis also works on power plant construction and operation compliance, some of which are: Abengoa Solar, Colusa, CPV Sentinel, Elk Hills, geothermal power plants, Henrietta, Inland Empire, Ivanpah SEGS, La Paloma, Marsh Landing, MountainView, TID Almond, SEGS III-VII, SEGS VII & IX, and Sutter.

Mr. Dennis has developed a broad knowledge of CEQA/NEPA impact analysis and mitigation involving water resources, water quality, soil resources, erosion hazards, geologic resources and hazards, paleontological resources, and waste management. The assessments he has authored involve basin-wide water management, basin overdraft, water quality, water conservation, recycled water, water transfers, groundwater recharge, flood potential, and wind/water soil erosion. He has worked on groundwater basin modeling, basin water balance estimates, and evaluations of groundwater drawdown impacts to groundwater quality, biology, and other groundwater users. He has also evaluated potential impacts from geologic hazards related to faults, earthquake related ground shaking, landslides, subsidence, compressive and expansive soils, and flood potential.

Mr. Dennis manages the Energy Commission's Quarterly Fuel and Energy Reporting (QFER) program for the water use and wastewater generation of all power plants 20 MW and greater in California. He designed the forms used to collected the QFER water and wastewater data and developed a database to manage the data collected, and through the course of this data collection effort, developed constructive working relationships with plant operators. The QFER water and wastewater information collected is used by news agencies, federal and state agencies, and members of the public.

Mr. Dennis trains and manages students to assist him with the QFER data collection and power plant construction and operation compliance oversight. He has been frequently asked to act as the Unit Supervisor when the supervisor is away on vacation, and works with other Energy Commission employees and government agencies on focused tasks and to resolve issues.

2004 to 2007, Science Applications International Corporation, Sacramento, CA
Senior Geologist/Project Manager
Consultant for Chevron, Northern California

Mr. Dennis managed environmental compliance for several former crude oil and Bunker C pipeline right-of-way and pump stations sites within the Central California region. He consolidated all groundwater monitoring and sampling for the portfolio into one program and managed that program. He developed and implemented new written field QA/QC procedures for the entire portfolio of sites, and developed and implemented an analytical laboratory evaluation plan. He also initiated low-flow groundwater sampling from wells and the use of pre-packed filter screens in open boreholes to reduce water turbidity in samples collected, allowing laboratory detection limits to be low enough for polynuclear aromatic hydrocarbon impacted groundwater risk-assessment evaluation. He initiated a crude oil remediation study for the portfolio. Mr. Dennis also developed workplans and conducted subsurface soil and groundwater investigations and prepared reports documenting the results of those investigations. He developed a soil vapor survey workplan and installed multiple completion soil vapor wells. He also worked with a GIS team to incorporate all pertinent site data into a web-based GIS and geo-reference the GIS as appropriate. This portfolio required a significant amount of front-end planning and coordination. Mr. Dennis developed and managed all site budgets and billing, and performed annual staff reviews. As a senior project manager, Mr. Dennis was the geologist in responsible-charge for the work performed by other geologist in the office and while conducting work in the field.

2004 to 2004, Bay Consulting Services, LLC, Rocklin, CA
Consultant/Principal Owner

Mr. Dennis developed the company from a concept to a viable business. Provided environmental consulting services for Chevron Corp. projects and other environmental companies. Completed several closure requests with Tier I/II risk analysis. Conducted company billing and accounting.

2001 to 2004, Cambria Environmental Technology, San Ramon and Rocklin, CA
Senior Geologist/Office Manager
Consultant for Chevron and East Bay Municipal Utility District

Mr. Dennis started Cambria's Rocklin office and grew that office to a staff of over 12 in less than a year through initiative and hard work. He worked as a liaison for the client and regulators, developed and managed all site budgets and billing, and performed annual staff reviews, hiring, and employment termination.

Chevron, Northern California. Mr. Dennis managed environmental compliance for a portfolio of 40 to 60 Chevron Corp. service stations and bulk fuel plants in Northern California. He developed workplans and conducted subsurface soil and groundwater investigations for these sites, some of which were located in the sensitive Lake Tahoe area. Each site was unique with its own operational history and hydrogeologic conditions. He achieved regulatory closure of over 30 Chevron sites by application of active remediation and by demonstration that attenuation processes would naturally cleanup the refined fuel products in the soil and groundwater.

To bring these sites to regulatory closure, Mr. Dennis initially prepared workplans to develop an understanding of the site history, hydrogeologic conditions, and to identify the extent, concentration, and type of fuel product in the subsurface associated with the site. The workplans included regulatory record searches, aerial photographs evaluations, the design of soil borings and groundwater monitoring well networks for subsurface geology and aquifer characterization. Mr. Dennis then conducted site investigations pursuant to these regulatory approved workplans.

The site investigations included the drilling soil borings, logging of soil borings, and the collection of soil samples from the vadose zone, capillary fringe, and saturated zones for chemical and physical analyses and grab-groundwater samples for chemical analyses. Based on these results and field judgment, Mr. Dennis was responsible for the completion of soil vapor extraction wells and groundwater monitoring wells in accordance with industry guidelines and best professional practice. He also was the geologist in responsible-charge for the preparation of reports that evaluated the data collected and made conclusions and recommendations based on the results of the evaluation. As a senior project manager, Mr. Dennis was the geologist in responsible-charge for the work performed by other geologist in the office and while conducting work in the field.

Mr. Dennis helped develop and received State Underground Storage Tank (UST) Fund pre-approved for approximately 100 low-risk ChevronTexaco sites as part of a management transfer initiative. He also worked with Caltrans on a freeway (CA I-80) expansion project that required excavation and dewatering beneath a former Chevron site. Mr. Dennis worked with Caltrans to build into the Caltrans request for bid specifications for handling petroleum impacted excavated soils and water. As a result of this effort, the expansion project is now complete and the former Chevron site remediated.

East Bay Municipal Utility District, Northern California. Mr. Dennis brought to Cambria a three-year, $275K/yr maximum EBMUD contract. The contract focused on pre-trenching activity soil sampling/analysis for potential contaminant identification and soil disposal. He developed a small group of professionals to manage this portfolio. As part of this project, Mr. Dennis managed several EPA SW-846 statistical soil analysis projects at District landfill sites with volumes up to approximately 180,000 cubic yards of landfilled soil. He created and surveyed statistical grids on the landfills and characterized the soil for removal to Class III or Class II landfills. He also conducted site investigations and quarterly groundwater monitoring projects at EBMUD facilities at the Camanche and Pardee Reservoirs.

2000 to 2001, Alisto Engineering, Lafayette, CA
Senior Geologist/Project Manager
Consultant for Caltrans and Industrial Facilities

Caltrans, Northern California. Mr. Dennis conducted site investigations at Caltrans sites and conducted statistical analyses of the soil from the shoulders of several Caltrans highways in Southern California. He performed the statistical analyses to determine hazard levels of lead in the soil, which would assist in soil management planning in proposed highway construction corridors. The statistical analyses were performed on sample populations ranging from approximately 80 to 300.

Industrial Facilities, Northern California. Mr. Dennis also conducted site investigations at several industrial sites in Northern California. He developed storm water pollution prevention plans (SWPPPs) for development projects in downtown San Jose and a Caltrans project along CA I-680. Mr. Dennis worked as a liaison for clients and regulators, and developed and managed all site budgets and billing for both the industrial facilities and Caltrans projects.

1998 to 2000, Alton Geoscience-TRC, Concord, CA
Senior Geologist/Project Manager
Consultant for ExxonMobil and Quick Stop Markets

ExxonMobil and Quick Stop Markets, Northern California. Mr. Dennis managed environmental compliance for a portfolio of ExxonMobil and Quick Stop Markets service station and bulk fuel plant sites. He developed workplans and conducted subsurface soil and groundwater investigations. Mr. Dennis achieved regulatory closure of over 30 of these sites by application of active remediation and demonstration that attenuation processes would naturally cleanup the refined fuel products in the soil and groundwater. Site investigations included the drilling and logging of soil borings, and collection of soil samples from the vadose, capillary fringe, and saturated zones for chemical and physical analyses and grab-groundwater samples were collected for chemical analyses. Based on these results and field judgment, Mr. Dennis was responsible for the completion of soil vapor extraction wells and groundwater monitoring wells in accordance with industry guidelines and best professional practice. He was also responsible for the preparation of reports that evaluated the data collected and made conclusions and recommendations based on the results of the evaluation. Mr. Dennis also managed the application of high vacuum, dual-phase (soil vapor and groundwater) extraction at several of these sites.

Notably, after two years of negotiations, technical presentations, and meetings, Mr. Dennis secured the recession of a RWQCB cleanup and abatement order and site closure for a former bulk plant on the sensitive Napa River. This bulk fuel plant was one of several along the river and where the tidal influences on the river affected the petroleum product in the groundwater. Plumes of liquid and dissolved phase hydrocarbons were present in the groundwater at adjacent sites and at the subject site.

1993 to 1995, Project Manager, GeoResearch, Long Beach, CA
Staff Geologist/Project Manager
Consultant for Unocal CERT

Unocal CERT, Southern California. Mr. Dennis managed environmental compliance for a portfolio of Unocal CERT projects in Southern California. He developed workplans and conducted subsurface soil and groundwater investigations for these sites. He frequently utilized mobile laboratories to assist in the placement of soil borings, vapor extraction, and groundwater wells. He conducted risk assessments, site assessments, tanks pulls, station demolitions, aquifer and vapor extraction tests, and remediation system designs and installations.

1990 to 1993 Staff Geologist, AeroVironment, Monrovia, CA
Staff Geologist/Project Manager
Consultant for Industrial Sites and Air Force Base Projects

Industrial Sites and Air Force Base Projects, Southern California. Mr. Dennis managed industrial projects and participated on government projects as a project geologist. He was a team leader during field documentation over 400 former homestead sites at Edwards AFB using GPS technology. This documentation included well locations, archaeological finds, and biological concerns. Mr. Dennis helped develop a database to manage all the data collected. He also conducted groundwater sampling according to AFCEE protocols and conducted soil-vapor and geophysical surveys at Vandenberg AFB. He was a member of the design team of a mobile soil-vapor laboratory that housed a gas chromatograph for sample analysis, and was lead designer of an insitu soil-vapor sample collection system. Mr. Dennis also managed two field teams for monitoring landfill vapor emissions and subsurface migration at active San Bernardino and Riverside County operated landfills, wrote the standard operating procedures for the fieldwork, conducted field training, and prepared quarterly AQMD reports. He also developed the contract for and managed quarterly groundwater monitoring and sampling at the Powerine Oil Refinery in Santa Fe Springs.

PUBLICATIONS

2007 and 2011 Integrated Energy Policy Report, California Energy Commission (one of many authors)
California Energy Commission Final Staff Assessments
Numerous Phase I Environmental Site Assessments
Numerous Groundwater Monitoring Reports
Numerous Site Investigation Workplans
Numerous Site Investigation and Remediation Reports

AWARDS

California Energy Commission Superior Accomplishment Award, 2010

DECLARATION OF
Mary Dyas

I, Mary Dyas:

1. I am presently employed by the California Energy Commission in the Compliance Office of 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 helped prepare the staff testimony on Executive Summary, Introduction, General Conditions, and Project Description for the Blythe Solar Power Project (09-AFC-9C) 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: 9/18/2013 Signed: M Dyas

At: Sacramento, California

MARY DYAS
CALIFORNIA ENERGY COMMISSION – COMPLIANCE PROJECT MANAGER

PROFESSIONAL EXPERIENCE

Planner II/III – Energy Facilities Compliance Project Manager — ***05/01/2008 to Present***
Siting Unit / Siting and Compliance Office
California Energy Commission, Sacramento, California

Compliance Project Manager—Provide oversight of energy facility construction and operation activities to ensure compliance with conditions of certification. Function as team leader for all compliance monitoring activities, processing of post-certification amendments, complaints, and facility closures.

Currently acting as working team leader on projects filed with the Energy Commission including renewable energy projects (Blythe Solar Power Project) and natural gas-fired energy projects (El Segundo Energy Center) in the licensing, construction and operational phases of each project.

Planner I/II – Energy Facilities Siting Project Manager — ***01/18/2006 to 04/30/2008***
Siting Unit / Siting and Compliance Office
California Energy Commission, Sacramento, California

Siting Project Manager – Provide day-to-day management of complex and controversial energy facility siting projects and renewable solar projects, including the Carrizo Energy Solar Farm Project, Bullard Energy Center, El Centro Unit 3 Repower Project and Chevron Replacement Project. Planning, organizing and directing the work of an interdisciplinary environmental and engineering staff team engaged in the review of complex or controversial energy facility siting Applications for Certification.

Energy Analyst / Associate Energy Specialist – LNG Research — ***09/27/2002 to 01/17/2006***
Natural Gas Office / Transportation Division
California Energy Commission, Sacramento, California

Coordinating and assisting with the facilitation of monthly Interagency LNG Working Group meetings involving cooperative federal, state, and local agencies; assisting with report writing conducting LNG facility assessments; Organizing/facilitating public workshops and preparing status reports on LNG facility development for use by Commissioners and Governor's Office, as well as reviewing and analyzing LNG-related legislative bills in California; Creating and maintaining the Commission LNG webpage, researching and preparing numerous LNG fact sheets for public education, and gathering information on new technology, tracking new LNG projects, and LNG market information.

Office Technician / Energy Analyst - Assistant Siting Project Manager — ***06/27/2000 to 09/27/2002***
Siting Unit / Siting and Compliance Office
California Energy Commission, Sacramento, CA

Assisting energy facility project managers with organization of and conducting workshops and public meetings between staff and power plant developers, other governmental agencies, private organizations, and the public. Also assisting with the reviewing, evaluating and editing of project correspondence, reports, and testimony as well as assisting project secretaries, and Office Managers as needed. Also performed all the same duties in relation to the Emergency Power Plant Permitting 21-day, 4-month, 6-month and 12-month projects.

Office Technician / Energy Analyst - Assistant Siting Project Manager ***06/27/2000 to 09/27/2002***
Siting Unit / Siting and Compliance Office
California Energy Commission, Sacramento, CA

Managing the Siting Peak Workload Contract, including the preparation of hundreds of work authorizations, invoices, and general coordination of work between technical staff and contractor and preparing associated budget information for office managers and executive office.

EDUCATION

Bachelor of Science degree in Biological Sciences ***California State University, Sacramento ~ 1995***

DECLARATION OF
Sudath Edirisuriya

I, Sudath Edirisuriya:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission and Environmental Protection Division as an Electrical 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 on Transmission System Engineering, for the Blythe Solar Power Project amendment 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: September 19, 2013. Signed: Sudath Edirisuriya

At: Sacramento, California

Sudath Edirisuriya
1916 Ackleton Way
Roseville CA 95661
USA **Phone +916-654-4851, +916-749-3372**

EDUCATION:

Bachelor of Science Degree in Electrical Engineering at California State University Fullerton, California, USA

ATTAINMENTS:

Member of the Professional Engineers in California Government, California, USA
Vice President Electrical Engineering Society-California State University Fullerton, USA.

EXPERIENCE:

November-2001 to Present: - Electrical Engineer, System Assessment and Facilities Siting Division, California Energy Commission, USA.
Working in the Transmission System Engineering unit on licensing generation projects (Renewable and Conventional Power Plants).Work involves evaluating generation interconnection studies (SIS and FS), there reliability and environmental impacts on transmission system, preparing staff assessment reports, presenting testimony. Perform reliability studies and coordinating data and technical activities with utilities, California ISO and other agencies. Conduct and perform planning studies and contingency analysis including power flow, short-circuit, transient, and post-transient analysis to maintain reliable operation of the power system. Understanding of regulatory and reliability guidelines, WECC and NERC planning and operation criteria, CPUC and FERC requirements. Knowledge in load forecasting, Power plant efficiency improvements and Substation relay coordination. Review technical analyses for WECC/CA ISO/PTO transmission systems and proposed system additions; and provide support for regulatory filings.

June-1998 to November-2001: - Project Electrical Engineer, Design Electrical Engineering Section, Department of Transportation, California, USA.
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, USA.
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 GE Power 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 maintenance of substations in City Electrical Utility System. Upgrade Station Light and power transformers; upgrade capacitor banks; replacement of 15kV-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.

DECLARATION OF
Alvin Greenberg, Ph.D.

I, **Alvin Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Siting, Transmission, and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepared the staff testimony on **Hazardous Materials Management and Worker Safety/Fire Protection** for the modified **Blythe Solar Power Plant** (09-AFC-6C), based on my independent analysis of the Petition for Amendment dated June 28, 2012 and supplements hereto, responses to staff data requests, 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: Sept. 19, 2013 Signed: [signature]

At: San Rafael, California

Risk Science Associates
37 Mt. Whitney Dr., Suite A, San Rafael, Ca. 94903
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., 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: 32

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) (program discontinued in 2012)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
American Chemical Society
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 32 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 hazardous wastes on those sites. 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 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

Human Health Risk Assessments for the Ophir Road, 20th St., Durham, and Norcal Scrap Metal Recycling Sites (September 2010 – present)

Human Health Risk Assessment and Hazardous Material Assessment at the former Nestle Waters of North America, Inc. McCloud Site (August 2012)

Review and Evaluation of the Extent of Contamination and Risk Posed by the former Unocal Tank Farm Area, San Luis Obispo, CA (July 2009 – April 2011)

Review and Evaluation of the former Mill Hazardous Waste Site, North Fork, CA (2009)

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 of Children's Exposure via the Air Pathway to Diesel Exhaust from School Buses (2007-2008)

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

Occupational Safety and Health Audit and Air Pathway Assessment for a Composting System at the Cold Canyon Landfill, San Luis Obispo County (2010)

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
Mark R. Hamblin

I, Mark R. Hamblin declare as follows:

I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection (STEP) Division, Environmental Protection Office as a Planner II.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the staff testimony on Visual Resources, for the Petition to Amend the Commission Decision for the Blythe Solar Power Project based on my independent analysis of the Petition to Amend and supplements hereto, 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.

Dated: Sept. 17, 2013 Signed: Mark R. Hamblin

At: Sacramento, California

MARK RUSSELL HAMBLIN

Professional Experience

California Energy Commission, 1516 9th St., Sacramento CA 95814-5504
Planner II November 2000 to present
Prepares an independent technical analysis in the area(s) of land use planning, traffic & transportation, and visual resources pertaining to the potential siting of natural gas fired power generation plants and solar power facilities. Provides recommendations to the Energy Commission. Reviews information provided by the applicant and other sources to assess the environmental effects of energy facility proposals as required by the California Environmental Quality Act (CEQA), and the California Energy Commission siting regulations. Evaluates project in accordance with federal, state and local laws, ordinances, regulations, standards; coordinates proposal with federal, state and local agencies. Conducts field studies; oversees technical consultant(s); participates in public workshop(s); presents sworn testimony during evidentiary hearings. Performs compliance monitoring for projects approved by the Energy Commission ensuring that power plants are constructed and operated according to the conditions of certification of their license.

Yolo County Planning and Public Works Department, 292 W. Beamer St., Woodland CA 95695
Associate Planner June 1992 to October 2000
Advised and assisted individuals in the processing of land use planning requests (general plan amendments, conditional use permits, subdivision maps, etc.); reviewed the request for consistency with state zoning and planning law (e.g., CEQA, the Subdivision Map Act, Williamson Act, etc.), the county General Plan, the county government code for presentation in a staff report before for the county planning commission and/or county board of supervisors; served as board of supervisors liaison and planning department staff person to citizen and inter-agency committees (county airport advisory committee, county habitat conservation plan steering committee, and community general plan citizen advisory committee(s); drafted zoning ordinances and regulations; prepared environmental assessment documents in accordance with the National Environmental Policy Act (NEPA); hired and supervised consultants; served as county zoning administrator; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or over the telephone regarding land use and development issues in the county.

Yolo County Community Development Agency, 292 W. Beamer St., Woodland CA 95695
Assistant Planner January 1991 to June 1992
Advised and assisted individuals in the processing of land use planning requests; reviewed the request for consistency with state zoning and planning law, the county

General Plan and county government code; presented the information pertaining to the land use planning request in a staff report for consideration by the county planning commission; drafted zoning ordinances; supervised consultants; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or over the telephone regarding land use and development in the county.

Tulare County Planning and Development Department, Civic Center, Rm. 105, Visalia, CA 93291
Planning Technician II   March 1988 to January 1990
Advised and assisted individuals in the processing of land use planning requests; reviewed request for consistency with state zoning and planning law, the county General Plan, and county government code, analyzed the information for presentation in a staff report before the county zoning administrator, site plan review committee, or planning commission; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter and over the telephone regarding land use planning and development in the county.

Education

University of California, Davis Extension. Davis, California. Course work in California Land Use Planning and the California Environmental Quality Act 1988 to 1995.

Cosumnes River College. Sacramento, California. Course work in television and radio broadcasting 1990 to 1991.

California State University, Bakersfield. Bakersfield, California. Master of Public Administration; August 1988. Concentration in Public Policy. Course work in Business Administration and Political Science.

California State University, Sacramento. Sacramento, California. Bachelor of Science in Public Administration; May 1984. Concentration in Human Resources Management.

Porterville College. Porterville, California. Associate in Arts Social Science; May 1982. Course work in Administration of Justice.

Awards

2009 Superior Accomplishment Award – Recognition of Outstanding Contribution in the training of staff new to the Environmental Protection Office, Community Resources Unit and unfamiliar with the unit's analytical methodologies and approaches in the areas of land use, visual resources, and traffic/transportation. Awarded by California Energy Commission.

2001 Superior Accomplishment Award – Recognition of Outstanding Performance and Contribution as a team member of the 21 Day, 4, 6, and 12 month processes team. Awarded by California Energy Commission.

2001 Superior Accomplishment Award – Recognition of Outstanding Performance and Contribution as a team member of the expedited 4 Month Application for Certification/Small Power Plant Exemption Team. Awarded by California Energy Commission.

2000 Yolo County Planning Commission Resolution – Appreciation of Service for nearly 10 years of service to the Yolo County Planning Commission and employment at the Yolo County Planning and Community Development Agency.

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 **Blythe 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: 9/23/13 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
John Hope

I, **John Hope**, declare as follows:

1. I am presently employed by **California Energy Commission** in the **Environmental Protection Office** of the **Energy Facilities Siting Division** as a **Planner II**.

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 **Blythe 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: 7/16/13 Signed: [signature]

At: Sacramento, California

JOHN HOPE

1516 9th Street, MS 40
Sacramento, California 95814

(916) 654-7119
john.hope@energy.ca.gov

Land Use and Environmental Planner
John Hope has thirteen years experience with current and long-range land use planning and environmental planning. He has served the public interest through evaluating economic, social, and environmental issues in communities. He is a skilled advocate effective in presenting professional planning knowledge to interest groups, the public, and political affiliations.

PROFESSIONAL EXPERIENCE

CALIFORNIA ENERGY COMMISSION, Sacramento, California
Environmental Planner II, December 2011 to Current

As part of the Siting, Transmission and Environmental Protection (STEP) division - Environmental Office, I prepare environmental documentation for proposed energy facilities for the Commission as required by the California Environmental Quality Act (CEQA). Specifically, I write technical analyses for facility siting cases and planning studies in the areas of socioeconomics, environmental justice, land use, traffic and transportation, and visual resources, along with and formulate solutions and mitigation unique to each individual energy facility. I provide expert technical expertise and serve as a member of inter-disciplinary team that evaluates potential environmental and socioeconomic effects of proposed power plants, policies, and plans for energy development in order to satisfy the requirements of the Warren-Alquist Act and CEQA.

AECOM, Sacramento, California
Noise Analyst, February 2010 to July 2011

I served as assistant project manager, environmental planner, or air quality/noise analyst for various CEQA/NEPA documents. My work focused on preparing environmental setting and impact analysis sections, such as land use, traffic, public services, for projects related to infrastructure improvements, residential development, fairgrounds, industrial expansion, business parks, mixed-use developments, and economic appraisal. I used various modeling techniques along with SoundPLAN, a software-based noise prediction modeling program, to assess project-generated noise levels in an environment. Through the use of SoundPLAN, I graphically mapped and visually evaluated project-generated noise levels based on principles of acoustics. I also used SoundPLAN to model noise maps, design traffic noise mitigation, and predict combined noise levels. My experience in long-range planning also involved preparation of various elements for general plans and community plans.

EDAW | AECOM, Sacramento, California
Associate Environmental Planner, September 2004 to June 2009

I wrote technical sections and managed environmental documents that analyze and describe to the public the potential environmental impacts of implementing development projects, including needed on-site and offsite infrastructure. I supervised preparation of environmental documents utilizing information from the client (i.e., state, county, city) and other professionals (e.g., air quality consultant, traffic engineers) to conduct environmental impact analysis of development projects. I also wrote sections and conducted research for general plans and specific plans. I worked as part of a team in preparing these documents to meet the requirements of state and federal permit regulations. I diligently maintained budgets and worked within stringent schedules as part of managing preparation of environmental and community planning documents with local agencies, cities and counties, and environmental specialists. I prepared scopes of work and proposals for new work opportunities.

STANTEC CONSULTING, Sacramento, California
Project Planner, July 2002 to August 2004

I was responsible for providing land planning and environmental impact analysis in environmental engineering firms with various environmental remediation projects throughout northern California. I conducted hands-on oversight of remediation projects to assess the onsite environmental impacts and analyzed their successfulness. I provided my proficient writing skills through the preparation of site reports related to remediation projects. I was relied upon to provide my land planning, environmental impact analysis, and entitlement processing expertise.

I was also responsible for providing assistance to land developers through the entitlement process including preparing development applications, preparing due diligence reports, and representation of the project to the public-at-large. I assisted cities and counties with the preparation of environmental documents and the processing of proposed land development projects. I managed the implementation of land development projects including large residential subdivisions, commercial development, public facilities, and business parks by coordinating efforts being pursued by other associates including surveyors, engineers, environmental specialists, public agencies, and the developer themselves. I also wrote technical sections that analyzed the environmental impacts associated with large infrastructure improvement projects and prepared the environmental document articulating the team's findings. Co-workers relied upon me to provide land use and environmental planning expertise towards a team effort.

PACIFIC MUNICIPAL CONSULTANTS, Rancho Cordova, California
Assistant Planner, July 1999 to July 2002

As part of my work experience I evaluated proposed development projects, provided code enforcement, and assisted the public-at-large. I gained experience in long-range planning from diligent researching, and writing technical sections for General Plans and environmental documents.

As part of a team effort, I was responsible for the expedited review and management of proposed development applications through the entitlement process and conducting environmental review while working as a land use planner for the City of Elk Grove. I was responsible for processing and reviewing current planning projects applications such as subdivision maps, use permits, design review applications, staff level discretionary review, and other entitlements as assigned by the Community Development Director. As part of this process, I evaluated proposed projects with the requirements of the municipal code and General Plan, presented development projects, and portrayed issues surrounding the project to decision makers and the public through writing staff reports and articulating my professionalism to Planning Commissions and City Councils. As time went on, I worked my way up for the opportunity to process larger and more complicated development projects.

In addition, I worked on the City of Elk Grove's first General Plan by writing and analyzing all the quantitative and statistical data for the Housing element and administered public meetings and workshops. I wrote the draft Housing Element, started the State certification process with the Department of Housing and Community Development, and assisted with the preparation of other required elements of the General Plan. I also utilized GIS software for manipulating and visually presenting information related to the community.

I gained experience with the environmental impact review process which resulted from analyzing and comprehending technical studies and incorporating their information by writing technical sections for environmental documents and I coordinated the implementation of mitigation monitoring and reporting programs. As my experience with the environmental review process grew, my work ethic allowed me to increase my responsibilities as related to more environmentally controversial projects.

EDUCATION

California Polytechnic State University, San Luis Obispo
Bachelor of Sciences, City and Regional Planning

This program provided a hands-on experience which allowed me to execute environmental impact assessments and site analysis, create site designs, research planning law and ordinances, present to several public and private groups, create graphic presentations, and conduct hands-on field research for specific projects located along the California central coast. I gained knowledge of various land use design concepts through hands-on draft work with computers and graphic tools.

DECLARATION OF
Jeff Juarez

I, **Jeff Juarez**:

1. I am presently employed by the California Energy Commission in the **Environmental Office** of the Siting, Transmission and Environmental Protection Division as a Planner II – Energy Facility Siting.

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 the evaluation of **Alternatives** for the **Blythe 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 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: 17SEP2013 Signed: [signature]

At: Sacramento, California

Jeff Juarez

1516 NINTH STREET MS 40
SACRAMENTO CA 95814

916.654.3947
jeff.juarez@energy.ca.gov

Education

University of California, Berkeley
Master of City Planning (2000)
Master of Landscape Architecture (2000)
Concentration: Urban Design

California State Polytechnic University, Pomona
Bachelor of Science in Landscape Architecture (1995)

Experience

Urban and Regional Planning and Design

California Energy Commission, Sacramento, CA (2013 – present)
Planner II – Energy Facility Siting: Identify and analyze environmental effects of proposed energy facilities for compliance with the requirements of the Warrant-Alquist Act and CEQA.

Los Angeles County Department of Regional Planning, Los Angeles, CA (2007 – 2010)
Regional Planning Assistant II: Implement local coastal programs and land use plans of the Santa Monica Mountains Coastal Zone; revise and prepare new coastal plan standards.

City of Foster City Planning Department, Foster City, CA (2002 – 2003)
Assistant Planner: Land use planning; prepare municipal park landscape improvement plan.

City of Fremont Planning Department, Fremont, CA (1999 – 2001)
Assistant Planner: Assist in developing Central Business District Concept Plan Design Guidelines; plan, coordinate, and facilitate General Plan Housing Element Update community outreach and participation.

Essential planning and design duties:

- Project management and coordination.
- Compile, analyze, interpret, and present planning data.
- Discretionary site plan and design review.
- Review building permit technical plans.
- Environmental review and analysis; prepare CEQA documents.
- Communicate planning policies, processes, and procedures.
- Prepare and present reports and recommendations to local review boards, planning commissions, city councils, and the Los Angeles County Board of Supervisors.

Landscape Architecture

California State Polytechnic University, Pomona, Pomona, CA (2003 – 2007)
Assistant Professor: Instruct undergraduate and graduate landscape architecture design courses of an accredited four-year landscape architecture program in the College of Environmental Design.

DECLARATION OF
Steven Kerr

I, **Steven Kerr**:

1. I am presently employed by the California Energy Commission in the Community Resources Unit of the Siting, Transmission and Environmental Protection Division as a **Planner II**.

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 **Socioeconomics**, for the **Blythe Solar Power Project (09-AFC-6C)** 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: September 17, 2013 Signed: ____________________

At: Sacramento, California

Steven Kerr

Professional Experience:

California Energy Commission — Sacramento, CA
January 2012-Present — *Planner II*

- Review power plant applications and amendments for socioeconomic, land use, transportation, and visual impacts.
- Evaluate projects in accordance with CEQA, the California Energy Commission siting regulations, and federal, state and local laws, ordinances, regulations, standards (LORS).
- Participate in public workshops and hearings regarding proposals.
- Write environmental analysis documents.

Thomas P. Kerr Inc. — Sacramento, CA
August 2011-January 2012 — *Property Manager*

- Management of properties and assets throughout California and Oregon.
- Assist in the preparation of mobile home park closure impact report for Port of San Luis.
- Use various software applications to produce and review billing and financial records.
- Work with local agencies to coordinate infrastructure improvements.

Ground(ctrl) — Sacramento, CA
February 2010-August 2011 — *Director of Customer Support*

- Coordinate and provide customer support for A-list musical artist fan clubs, online stores, e-mail marketing, ticketing, aggressive online marketing, and much more.
- Resolve escalated customer support issues, credit card disputes, and Better Business Bureau cases.
- Supervise and train customer support team members and interns.

City of Sacramento — Sacramento, CA
General Services Department — *Customer Service Representative*
July 2009-February 2010

- Perform concurrently multiple customer service related duties for all City of Sacramento departments by phone/email.
- Interpret and apply City regulations and procedures as applicable to billing, fees, and collections.
- Learn and explain the organization, procedure and operation details of the City.
- Use a variety of business software applications and assess maps.

City of Sacramento — Sacramento, CA
Development Services Department — *Assistant Planner*
February 2007-July 2009

- Project manager for various residential, commercial, industrial, and office development projects.
- Assist customers with zoning, design review, preservation, environmental, subdivision code, and sign questions, both at the public counter and by phone/email.
- Provide customers with required entitlement information, fee estimates, and accept applications for proposed development projects.
- Review applications and plans for consistency with City Codes, General Plan, and applicable community plans, specific plans and planned unit development guidelines.
- Present projects at community meetings and work with neighborhood association leaders on controversial projects.
- Write staff reports and conditions of approval.
- Present projects at Zoning Administrator, Planning Commission, and City Council public hearings.
- Research development and entitlement histories of parcels.

City of Atascadero | Atascadero, CA
Community Development Department | *Planning Intern*
March 2005-June 2006

- Prepare environmental review documents.
- Review business licenses and building permits.
- Draft letters and staff reports.
- Respond to questions from the public on planning and zoning related issues.
- Access and update information in GIS and Excel

Education:

2005-2006 California State Polytechnic University, San Luis Obispo, CA
Coursework toward MS in Public Policy

2000-2005 California State Polytechnic University, San Luis Obispo, CA
Bachelor of Science in City and Regional Planning

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 **SENIOR 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 Revised Staff Assessment on **Noise and Vibration** for the **Blythe 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: 9/16/2013 Signed: [signature]

At: Sacramento, California

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 **SENIOR 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 **Blythe 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: 9/16/2013 Signed: [signature]

At: Sacramento, California

Shahab Khoshmashrab
Senior Mechanical Engineer

Experience Summary

Eighteen 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
  License No. M 32883, Exp. 9/30/2014

Professional Experience

2001-Current—Senior Mechanical Engineer – Siting, Transmission, and Environmental Protection Division – California Energy Commission

- Perform analysis of generating capacity, system reliability and safety, energy efficiency, noise and vibration, jurisdictional determination, and the mechanical, civil, electrical, and structural aspects of power plants during licensing, construction, and operation.

- As the Facility Design Unit's lead, or senior, review and manage the work of technical staff (other engineers) and contractors; ensure project deadlines are met; and ensure that projects propose and implement the most energy efficient technologies to satisfy project objectives while protecting the environment;

- Independently review and evaluate Applications for Certification to ensure compliance of power plants and related facilities with applicable laws, ordinances, regulations, and standards and California Environmental Quality Act, or CEQA;

- Prepare and recommend to the Siting Committee, conditions of certification (including mitigation measures) under which power plants should be licensed, constructed and operated;

- Present oral and written expert testimonies in support of analysis at evidentiary hearings held before the Siting Committee and the public; and

- Assist the California Energy Commission in policy making related to power generation.

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 both structural plans and detailed shop drawings using AutoCAD.

1995-1998—Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed 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
Jacquelyn Leyva Record

I, **Jacquelyn Leyva Record** :

1. I am presently employed by the California Energy Commission in the **Air Quality** of the Siting, Transmission and Environmental Protection Division as an **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 on **Air Quality** for the **Blythe 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 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: Jacquelyn Leyva Record Signed: September 19, 2013

At: Sacramento, California

(925) 324-1173 cell
jlrecord03@gmail.com

Jacquelyn Leyva Record

Experience

March '09 – Present **CA Energy Commission** **Sacramento, CA**
Air Resources Engineer

- Currently authoring staff assessment analyses for the technical area of air quality for the Engineering and Siting Division permitting power plant projects over 50 MW in the state of CA. Worked on renewable ARRA funding projects along with natural gas power projects.
- Reviewing emission compliance reports
- Authored staff analyses for project amendments
- Trained in CEQA and NEPA analysis, along with AERMOD air modeling.

August '08 – March '09 **ERRG, Inc.** **Martinez, CA**
Engineering Assistant

- Assisted with both technical and field duties for a variety of environmental investigations.
- Assisted on an environmental site assessment, preliminary assessments (PA), site inspections, and remedial investigations feasibility studies.
- Field duties performed include groundwater sampling and air sampling

June '07 – March '08 **Tetra Tech EC, Inc** **Santa Ana, CA**
Engineering Assistant Intern

- Working on various Department of Defense projects in environmental engineering.
- Helped assist in 5 year review of remediation approaches.
- Helping assist with a commercial project creating a water reuse/recycle treatment plant.

June '05 – September '05 **SF Regional Water Board** **Oakland, CA**
Contract Work – Special Project

- Wrote a memorandum regarding total petroleum hydrocarbons showing up as false positives in submitted quarterly monitoring reports for NPDES FUEL permit.
- Researched various EPA methods of testing for VOC, and Fuel constituents in water.
- Communicated with consultants from Weiss Associates and state funded laboratories to come to a conclusion for memorandum.
- Site inspections, site reports.

Education

2003-June 2008 University of California Irvine Irvine, CA

- B.S., Chemical Engineering
- MAES (Mexican American Engineers and Scientists) - Vice Chair 2004-2005
- CAMP summer science program participant 2003

June 1999 – September 2003 Las Lomas High School Walnut Creek, CA

- High School Diploma
- Life time member of CSF (California Scholarship Federation).

DECLARATION OF
Andrea Martine

I, **Andrea Martine**:

1. I am presently employed by the California Energy Commission in the **(Environmental Protection Office)** of the Siting, Transmission and Environmental Protection Division as an **(Planner II, Biological Resources)**

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 **(Biological Resources)**, for the **(Blythe Solar Energy 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 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: Sept. 16, 2013 Signed: Andrea Martine

At: Sacramento, California

Andrea Martine

Employment History

California Energy Commission

Planner II, Staff Biologist *12/2009 to present*

As a staff biologist with the Energy Commission, Ms. Martine analyzes the biological resource components of energy facilities siting applications to assess resource impacts, develop mitigation, and to evaluate compliance with applicable federal, state, and local, laws, ordinances, regulations, and standards. This requires working closely with biological resource protection and management agencies, subject matter experts, and Energy Commission consultants as well as with other Energy Commission staff to ensure the best available information is included in staff analyses.

California Department of Transportation, District 3

Associate Environmental Planner/Environmental *11/1998 to 7/2000*

Ms. Martine's primary duties with Caltrans as Project Biologist were to analyze environmental impacts to special status plants, wildlife and wetlands and stream associated with transportation projects in Northern California. She wrote environmental documents to satisfy CEQA, NEPA, obtained 404 permits, 401 certification and 1601 agreements for various transportation-related projects. She acted as liaison for Federal Highways Administration while reviewing documents prepared for local projects.

Jones & Stokes Associates, Inc.

Environmental Specialist/Botanist *04/1994 to 11/1998*

While with the environmental consulting firm Jones & Stokes Assoc. Inc., Ms. Martine specialized in listed Brachiopod surveys, special status plant and floristic surveys. She worked throughout California including Sacramento, Placer, Fresno and San Diego counties and several military sites (BEALE AFB, Camp Roberts, & Fort Hunter Ligget). Projects while at JSA included protocol-level surveys for special-status plants and brachiopods, wetland delineations, and monitoring vernal pools, seasonal wetlands and riparian vegetation at mitigation sites. Managed brachiopod projects and budgets and writing biological resources sections of documents to satisfy NEPA and CEQA requirements.

El Dorado National Forest

Botanist (Volunteer) *07/1993 to 08/1993*

Ms. Martine helped prepare environmental analyses of proposed timber and recreational projects in which, she produced inventories and assessments of the existing natural environmental conditions of project sites and watersheds.

EDUCATION

Biological Sciences *B.S.*

California State University , Sacramento *June 1993*

DECLARATION OF
Michael D McGuirt

I, : Michael D McGuirt

1. I am presently employed by the California Energy Commission in the Cultural Resources Unit, Environmental Protection Office, Siting, Transmission and Environmental Protection Division as an Energy Planner II.

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 Cultural Resources, for the Blythe Solar Power Project (09-AFC-6C) 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 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: 9/19/2013 Signed: [signature]

At: Sacramento, California

MICHAEL D MCGUIRT, MA, RPA

SUMMARY OF PROFESSIONAL EXPERIENCE

Over eighteen years of professional academic and cultural resources management experience in western North America, Hawai'i, Central America, and Eastern Europe. Former regulator and present planner with expert knowledge of Section 106 of the National Historic Preservation Act of 1966 (NHPA). Thorough knowledge of the California Environmental Quality Act of 1970, Section 110 of the NHPA, and the US Army Corps of Engineers' Appendix C. Working knowledge of the National Environmental Policy Act of 1969, Native American Graves Protection and Repatriation Act of 1990, and the Archaeological Resources Protection Act of 1979. Expert in developing and coordinating historic preservation solutions that comply with complex Federal, state, and local regulatory environments for large-scale energy, transportation, and telecommunications projects. Expert technical skills in geoarchaeology, mapping and spatial analysis, archaeological survey and excavation, and material culture analyses.

EDUCATION

MASTER OF ARTS, Anthropology, University of Texas at Austin
May 1996

BACHELOR OF ARTS, Anthropology and Archaeological Studies, University of Texas at Austin
December 1990

PROFESSIONAL AFFILIATIONS

Register of Professional Archaeologists
Society for American Archaeology
Society for California Archaeology
National Trust for Historic Preservation
California Preservation Foundation

HONORARY AFFILIATIONS

Honor Society of Phi Kappa Phi

RECENT PROFESSIONAL EMPLOYMENT

ENERGY PLANNER III, California Energy Commission, Sacramento, California
December 2009 to May 2010

Supervised an Energy Commission staff of five professional cultural resources analysts and a varying number of equivalent consultants in the development of CEQA and NEPA analyses of the potential effects that the construction and operation of proposed thermal power plants may have on significant cultural resources, developed and supervised the implementation of agency-wide programs to facilitate agency compliance with Federal historic preservation regulations, and supervised the periodic staff reviews of licensees' actions to ensure compliance with conditions of certification for extant licenses.

ENERGY PLANNER II, California Energy Commission, Sacramento, California
November 2007 to December 2009, June 2010 to present

Develop environmental impact analyses of the potential effects that the construction and operation of proposed thermal power plants may have on significant cultural resources. Apply applicable Federal, State, and local statutes and regulations, as they relate to the consideration of cultural resources. Design and execute cultural resource impact analyses that are appropriate to the specific regulatory context for each proposed project. Gather and evaluate information on projects and on cultural resources in project areas. Develop and maintain agency and public relationships to acquire the most useful data and to elicit input in the development of California Energy Commission conditions of certification. Succinctly convey, orally in different public forums and in different written technical formats, the results of cultural resource impact analyses and proposed conditions of certifications meant to mitigate adverse impacts to significant cultural resources. Periodic reviews of licensees' actions to ensure compliance with extant conditions of certification. Oversight of consultants' who are preparing cultural resource impact analyses.

ASSOCIATE STATE ARCHAEOLOGIST, Office of Historic Preservation, California Department of Parks and Recreation (California State Parks), Sacramento, California
May 2001 to November 2007

Regulator, in the California Office of Historic Preservation (OHP), of the Advisory Council on Historic Preservation's (Advisory Council) process implementing Section 106 of the National Historic Preservation Act (NHPA). Conducted among the most complex Section 106 reviews, and participated in, and often guided, the consultations of which those reviews were a part. Formally advised other OHP units and the California State Historical Resources Commission on the appropriate disposition and treatment of archaeological resources in the context of other State and Federal historic preservation programs that OHP either administers or in which OHP participates. Worked out of class for two consecutive, six-month terms as a Senior State Archeologist, from December 2004 through December 2005, supervising the Project Review Unit for the State Historic Preservation Officer (SHPO). As the Acting Chief of Project Review, managed and trained a staff of eight professionals and one clerical assistant to conduct, on behalf of the SHPO, the review of all Federal agency actions in the State of California under 36 CFR Part 800, the Advisory Council's Section 106 regulation.

ENVIRONMENTAL SPECIALIST III, Jones & Stokes, Sacramento, California
February 1999 to May 2001

Designed, conducted, and managed short- and long-term archaeological projects in California, Nevada, and New Mexico to comply with Sections 106 and 110 of the NHPA. Prepared proposals. Assisted with client contract negotiations. Conducted archaeological record searches and archival research. Directed Phase I pedestrian inventory surveys and test excavations for Phase II evaluations. Analyzed material culture assemblages. Prepared technical reports and regulatory compliance documents including National Register property and district evaluations, and monitoring and discovery plans. Represented clients in consultations with federal and state agencies, and coordinated and managed clients' compliance with federal cultural resource regulations and the cultural resource regulations of California, Nevada, and New Mexico.

ASSISTANT ANTHROPOLOGIST, Bernice Pauahi Bishop Museum, Honolulu, Hawai`i
August 1996 to June 1998

Assisted with archaeological project design, preparation of proposals, and client contract negotiations, directed Phase I pedestrian inventory surveys, test excavations for Phase I subsurface inventory surveys, test excavations for property evaluations, and data recovery excavations, and assisted with preparation of technical reports on short-term cultural resource management contracts. Analyzed field records, prepared site reports and synthetic report chapters, and analyzed and prepared reports on lithic assemblages for Phases I–III of a long-term federal highway project (Interstate Route H–3). Conducted research in Hawaiian archaeology, and delivered public and professional presentations of that research. Advised on the integration of geoarchaeological methods and techniques into cultural resource management field efforts, and on geoarchaeological interpretations of extant field records, and designed and conducted geoarchaeological components of fieldwork for short–term cultural resource management contracts.

ARCHEOLOGIST I, Archeology Survey Team, Texas Parks and Wildlife Department, Austin, Texas
December 1994 to May 1995

Assisted in the direction of pedestrian inventory surveys, the preparation of cultural resource management plans, and the preparation of state site forms and reports of investigations. Advised on the integration of global positioning system (GPS) technology and the field methods of archaeological survey.

ARCHAEOLOGIST, Lower Colorado River Authority, Austin, Texas
February 1994 to December 1994

Designed and implemented experimental mitigation measures for archaeological sites subject to fluvial and lacustrine erosion. Assisted in pedestrian inventory surveys and evaluation-phase excavations, the preparation of State site forms, the development of the agency's database for its archaeological site inventory, and public education initiatives that included site tours for primary and secondary students, and workshops with field and classroom components to instruct primary and secondary teachers.

RECENT PROFESSIONAL DEVELOPMENT

CULTURAL RESOURCE AND ENVIRONMENTAL LAW

The Section 106 Advanced Seminar: Reaching Successful Outcomes in Section 106 Review
Sacramento, California, Advisory Council on Historic Preservation, Tom McCulloch
March 2011

Renewable Energy Development: Impacts on Cultural Resources
Phoenix, Arizona, National Preservation Institute, Claudia Nissley
February 2011

Thresholds of Significance in Environmental Planning
Sacramento, California, University of California, Davis, Continuing and Professional Education, Terry Rivasplata and Maggie Townsley
February 2011

Successful CEQA Compliance: An Intensive Two-Day Seminar
Sacramento, California, University of California, Davis, Continuing and Professional Education, Terry Rivasplata and Maggie Townsley
June 2009

ACHP - FHWA Advanced Seminar: Reaching Successful Outcomes in Section 106 Review
Vancouver, Washington, Advisory Council on Historic Preservation, Don Klima and Carol Legard; Federal Highway Administration, Mary Ann Naber
October 2007

NEPA Compliance and Cultural Resources
Portland, Oregon, National Preservation Institute, Joe Trnka
October 2007

Section 106: How to Negotiate and Write Agreements
Sacramento, California, National Preservation Institute, Claudia Nissley
November 2004

Consultation with Indian Tribes on Cultural Resource Issues
Sacramento, California, National Preservation Institute, Thomas F. King and Reba Fuller
September 2003

Section 106: How to Negotiate and Write Agreements
The Presidio, San Francisco, California, National Preservation Institute, Thomas F. King
May 2002

Introduction to CEQA
Sacramento, California, University of California, Davis, Continuing and Professional Education, Ken Bogdan and Terry Rivasplata
July 2000

TECHNICAL ARCHAEOLOGY

Introduction to Historic Site Survey, Preliminary Evaluation, and Artifact ID
West Sacramento, California, California Department of Transportation, Julia Huddleson, Anmarie Medin, Judy Tordoff, and Kimberly Wooten; California Department of Parks and Recreation, Glenn Farris, Larry Felton, and Pete Schulz
September 2006

Principles of Geoarchaeology for Transportation Projects (Course No. 100246)
Sacramento, California, California Department of Transportation, Graham Dalldorf, Glenn Gmoser, Jack Meyer, Stephen Norwick, Adrian Praetzellis, and William Silva
October 2006

INFORMATION TECHNOLOGY AND CULTURAL RESOURCE MANAGEMENT

GIS: Practical Applications for Cultural Resource Projects
Sacramento, California, National Preservation Institute, Deidre McCarthy
September 2006

ENVIRONMENAL ANALYSES, TECHNICAL REPORTS, CONFERENCE PAPERS, AND PUBLICATIONS

ALLRED, SARAH, MICHAEL MCGUIRT, AND KATHLEEN FORREST
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BASTIAN, BEVERLY E. AND MICHAEL D. MCGUIRT
2009 **Cultural Resources**. In *Final Staff Assessment, Canyon Power Plant, Application for Certification (07-AFC-9), Orange County* (CEC-700-2009-008-FSA, September 2009), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-51. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

BLOSSER, AMANDA, MICHAEL D. MCGUIRT, AND BEVERLY E. BASTIAN
2008 **Cultural Resources**. In *Staff Assessment, Orange Grove Project, Application for Certification (08-AFC-4), San Diego County* (CEC-700-2008-009, November 2008), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-43. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

DARCANGELO, JENNIFER, JOHN SHARP, MICHAEL D. MCGUIRT, ANDREA GALVIN, AND CLARENCE CAESAR
2004 ***Section 106 for Experienced Practitioners: Consulting with the California SHPO** (GEV4111)*. Course taught on 8 September 2004 in Oakland to California Department of Transportation cultural resources personnel and private sector cultural resource consultants (8 hours).

DARCANGELO, JENNIFER, JOHN SHARP, MICHAEL D. MCGUIRT, AND ANDREA GALVIN
2005 ***How to Consult with the California SHPO***. Workshop presented on 23 April 2005 at the 39th Annual Meeting of the Society for California Archaeology, Sacramento, California (6 hours).

FORREST, KATHLEEN AND MICHAEL D. MCGUIRT
2010 **Cultural Resources**. In *Almond 2 Power Plant Project, Revised Staff Assessment* (CEC-700-2010-011REV, July 2010), edited by Siting, Transmission and

Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-51. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

GATES, THOMAS, AMBER GRADY, AND MICHAEL D. MCGUIRT

2012 **Cultural Resources**. In *Hidden Hills Solar Electric Generating System (11-AFC-2) Supplemental Staff Assessment* (June 15, 2012), pp. 1–101. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

JONES & STOKES

1999a ***Cultural Resource Inventory Report for Williams Communications, Inc. Fiber Optic Cable System Installation Project, Wendover, Nevada to the California State Line***. Volume 1: Draft Report. July. (JSA 98-358.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

1999b ***Cultural Resources Report for the Williams Communications, Inc. Interstate 80 Fiber Optic Cable System Installation Project***. Volume I. September. (JSA 98-358.) Submitted to Williams Communications, Inc., Tulsa, Oklahoma. On file with the State Historic Preservation Office, Carson City, Nevada.

1999c ***Archaeological Site Avoidance and Monitoring Plans for Williams Communications' Fiber Optic Cable Installation In the Union Pacific Railroad Right-of-Way, Doña Ana County to Hidalgo County, New Mexico***. October. (JSA98-379.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

2001 ***Final Phase II Cultural Resource Evaluation for the Kramer Mining District, Edwards AFB, Kern and San Bernardino Counties, California.*** Volume I. November. Sacramento, California. On file with the Base Historic Preservation Officer, Edwards AFB, California.

LEBO, SUSAN A. AND MICHAEL D. MCGUIRT

1997 ***Geoarchaeology at 800 Nuuanu: Archaeological Inventory Survey of Site 50-80-14-5496 (TMK1-7-02:02), Honolulu, Hawai`i.*** Department of Anthropology, Bishop Museum, Honolulu. (100 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998a ***Assessments of Stone Architecture: a Case Study from North Hālawa Valley, O`ahu***. Paper presented at the 11th Annual Hawaiian Archaeology Conference of the Society for Hawaiian Archaeology, Kailua-Kona, Hawai`i.

1998b ***Pili Grass, Wood Frame, Brick, and Concrete: Archaeology at 800 Nuuanu***. Department of Anthropology, Bishop Museum, Honolulu. (142 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

LENNSTROM, HEIDI A., P. CHRISTIAAN KLIEGER, MICHAEL D. MCGUIRT, AND SUSAN A. LEBO
1997 ***Archaeological Reconnaissance of Pouhala Marsh, `Ewa District, O`ahu***. Department of Anthropology, Bishop Museum, Honolulu. (14 pp.) Submitted to Ducks Unlimited, Inc., Rancho Cordova, California. On file with the State Historic Preservation Division, Honolulu.

MCGUIRT, MICHAEL D.
1996 ***The Geoarchaeology and Palynology of an Early Formative Pithouse Village in West-Central New Mexico***. Unpublished M.A. thesis, Department of Anthropology, University of Texas at Austin.

1998 **50-80-10-2010, 50-80-10-2016, 50-80-10-2088, and 50-80-10-2134**. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vols. 2a and 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–3, 1–44, 1–5, and 1–46. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

2002 **Committee Reports, OHP Liaison**. *SCA Newsletter* 36(3):4–5.

2004 **Committee Reports, OHP Liaison**. *SCA Newsletter* 38(2):7, 38(3):6–8.

2006 **Preservation Archaeology**. In *California Statewide Historic Preservation Plan: 2006–2010*, edited by Marie Nelson, pp. 8–15. California Department of Parks and Recreation's Office of Historic Preservation, Sacramento. Submitted to the National Park Service, Washington, D.C. On file at the California Office of Historic Preservation, Sacramento.

2007 **Dealing with Multi-element Cultural Resources under Section 106**. In *Historic Properties Are More Than Meets the Eye: Dealing with Historical Archaeological Resources under the Regulatory Context of Section 106 and CEQA*. Session presented on 25 April 2008 at the *33rd Annual California Preservation Conference* of the California Preservation Foundation in Napa, California, moderated by Michelle Messinger and Michael D. McGuirt (1 1/2 hours).

2010 **Cultural Resources and Native American Values**. In *Imperial Valley Solar Project (Formerly SES Solar Two), Supplemental Staff Assessment, Part II* (CEC-700-2010-013 SUP, August 2010), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. C.3-1–C.3-409 plus appendix B (118 pp.). Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

2012 **[Geology and geomorphology contexts (pp. 4.3-12–4.3-15), and discussions of geoarchaeological field investigations and the role of the investigations in the regulatory process (pp. 4.3-39–4.3-43)]** In *Rio Mesa Solar Electric Generating Facility, Preliminary Staff Assessment-Part B* (CEC-700-2012-006-PSA-PTB, October 2012), edited by Siting, Transmission and Environmental Protection Division, California Energy

Commission. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

McGuirt, Michael D., Amanda Blosser, and Beverly E. Bastian
2009 **Cultural Resources**. In *Final Staff Assessment, Beacon Solar Energy Project, Application for Certification (08-AFC-2), Kern County* (CEC-700-2009-005-FSA, August 2009), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-131. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

McGuirt, Michael D., Thomas Gates, and Amber Grady
2012 **Cultural Resources, Sandy Valley Off-site Alternative, Alternatives**. In *Hidden Hills Solar Electric Generating System (HHSEGS), Preliminary Staff Assessment* (CEC-700-2012-003-PSA, May 2012), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 6.1-25–6.1-32. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

McGuirt, Michael D. and Leslie H. Hartzell
1997 **50-80-10-2139 and 50-80-10-2459**. In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawa Valley, O`ahu*, vols. 2c and 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–17 and 1–5. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998 **Chapter 1: Introduction**. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vol. 1, edited by Department of Anthropology, Bishop Museum, pp. 1–14. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

McGuirt, Michael D. and Shannon P. MacPherron
1998 **50-80-10-2137**. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vol. 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–86. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

McGuirt, Michael and Sarah C. Murray
2008 **Cultural Resources**. In *Preliminary Staff Assessment, Ivanpah Solar Electric Generating System, Application for Certification (07-AFC-5), San Bernardino County* (CEC-700-2008-013-PSA, December 2008), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 5.3-1–5.3-73. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

McGuirt, Michael D. and Deborah I. Olszewski

1997 **50-80-10-2256**. In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawa Valley, O`ahu*, vol. 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–9. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

Mikesell, Stephen, Michael McGuirt, and Trish Fernandez

2008 **Introduction to the White Papers in State Historical Resources Commission Archaeology Committee White Papers**. *SCA Newsletter* 41(1):18–21.

Sharp, John, Michael D. McGuirt, Jennifer Darcangelo, and Andrea Galvin

2004 ***How to Consult with the California SHPO***. Workshop presented on 18 March 2004 at the 38th Annual Meeting of the Society for California Archaeology, Riverside, California (4 hours).

DECLARATION OF
Dr. Obed Odoemelam

I, **Obed Odoemelam**:

1. I am presently employed by the California Energy Commission in the **Engineering Section** of the Siting, Transmission and Environmental Protection 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 on **Transmission Line Safety and Nuisance** for the **Blythe 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 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: 9/16/13 Signed: OOdoemelam

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
Casey Weaver

I, **Casey Weaver**:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting, Transmission and Environmental Protection Division as an **Engineering Geologist.**

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 **Geology and Paleontology Section**, for the **Modified Blythe 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 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: 9/16/2013 Signed: Casey

At: Sacramento, California

CASEY W. WEAVER, PG, CEG
1621 Delta Drive
Woodland, CA 95695
(530) 662-0482

SUMMARY OF EXPERIENCE:

Certified Engineering Geologist with over 20 years of environmental and geotechnical consulting experience. Experience includes remedial investigations and feasibility studies (RI/FS), groundwater investigations, corrective action plans, landfill studies (SWATs, siting, closure), preliminary environmental site assessments (PESA, Phase I), regulatory compliance (RCRA/CERCLA), geotechnical investigation/evaluation, geologic hazard evaluations, active fault evaluations, seismic studies, landslide evaluation/repair, foundation suitability studies, personnel management and business development.

EDUCATION:

B.S. Geology, Humboldt State University, Arcata, CA, 1981
University of California, Davis Extension Courses

REGISTRATIONS/LICENCES/CERTIFICATIONS:

Certified Engineering Geologist, California
Registered Geologist, California, Oregon, Arizona
Registered Environmental Assessor
OSHA 1910.120 Hazardous Waste Operations and Emergency Response - 40hr
OSHA 1910.120 Hazardous Waste Operations and Emergency Response - Supervising Operations at Hazardous Waste Sites.

PROFESSIONAL HISTORY:

2008 to Present **Engineering Geologist**
California Energy Commission, Sacramento, CA

Duties within the Water and Soils Unit of the Environmental Office in the Facilities Siting Division include review and evaluation of applications for certification of thermal power plants within the state of California. The focus of the work is on sensitive project sites that may have issues involving groundwater and surface water resources, soil erosion, flooding potential, water quality and plant-derived waste generation and disposal. In addition, evaluate construction, operation and maintenance of the facilities and conduct investigations to determine if violations of the program's regulations, the Energy Commission's conditions of certification, or the California Environmental Quality Act (CEQA) have occurred. Selected as the Energy Commission's seismic expert and representative on the multi-jurisdictional Independent Peer Review Panel reviewing seismic evaluations conducted for California's nuclear power plants.

2001 to 2008

Engineering Geologist
State Water Resources Control Board, Headquarters, Sacramento, CA

With the UST Enforcement Unit, under direction from the State Attorney General's Office, conducted inspections of UST systems to evaluate compliance with 1998 upgrade requirements. This work culminated in the largest settlement of its kind in the nation's history. In addition, conducted surveillance of unlawful discharges from remediation systems and conducted investigations of UST Fund fraud cases.

With the USTCF Technical Review Unit, evaluated the technical elements of USTCF claims.

With the Division of Financial Assistance, assisted with the development of program policy for the Agricultural Water Quality Grant Program ($46 million) and the Integrated Water Quality Grant Program ($380 million), participated in stakeholder workshops, contributed to multijurisdictional work groups for program development and implementation.

With the Office of Enforcement, conducted investigations of operator misconduct, wrote enforcement investigation reports and prepared disciplinary letters.

1998 to 2001

Senior Engineering Geologist
BSK & Associates, Rancho Cordova, CA

Designed and directed hydrogeologic investigations for use with environmental remediation projects. Supervised field personnel installing groundwater monitoring wells, conducting aquifer tests & SVE pilot tests, reviewed reports and workplans, and conducted business development.

Conducted review of Alquist-Priolo active fault hazard reports as county geologist for Kern County.

1993 to 1998 **Senior Geologist, Geoscience Team Leader and RI/FS Task Leader**

LAW Engineering and Environmental Services, Inc., Sacramento, CA

As Geoscience Team Leader, responsible for career development, training and personnel management of ten employees. This group consisted of 3 senior-level geologists, 4 project level geologists and scientists, 2 junior level geologists and 1 technician.

As RI/FS Task Leader, responsible for the development of cost estimates/budgets, preparation of Work Plans and Sampling and Analysis Plans, management of field activities, data collection and documentation associated with the investigation of 15 Installation Restoration Program sites at Beale Air Force Base awarded under several Delivery Orders with combined project budgets of $18 million. Also responsible for aerial photographic interpretations associated with a basewide (23,000 acres), Preliminary Assessment, and preparation of a basewide Hydrogeologic Evaluation Report.

1990 to 1993 **Senior Project Manger/General Manager**

Earthtec, Ltd., Roseville, CA

Management of Environmental Department, business development, preparation of cost estimates and proposals, client and regulatory agency interface, supervision and training, report writing, technical review, budget management, and quality control. Initiated and supported the development of company's wetland and wildlife departments. Typical projects included preliminary site assessments, soil vapor studies, detailed hydrogeologic evaluations, waste plume delineations, and development of remediation alternatives associated with landfills, service stations, bulk oil facilities and other potentially contaminated sites.

1981 to 1990 **Project Geologist**

SHN Group, Inc. Eureka, CA

Managed project work directed toward solving environmental issues at variably contaminated sites and provided geotechnical information for land development and construction. Responsibilities included development of cost estimates/budgets, planned and supervised field operations, collected and interpreted subsurface information, evaluated areas traversed by Alquist-Priolo Special Studies Zones and sites subject to slope stability hazards. Typical projects included geotechnical evaluations and geologic hazard studies for major subdivisions, hospitals, schools, lumber companies, run-of-the-river hydroelectric projects, underground storage tank sites, and solid waste landfills.

1979 to 1981

Geologist/Seismologic Technician
Woodward-Clyde Consultants, San Francisco, CA

Designed and operated a laboratory model to study surface effects of thrust faulting in connection with seismic evaluation studies for the PG&E Humboldt Bay nuclear reactor. In addition, installed and operated field seismographs in the Humboldt Bay region.

BLYTHE SOLAR POWER PROJECT (09-AFC-6C)
STAFF ASSESSMENT – Part A
Amendment to the Blythe Solar Power Project

Executive Summary ....Mary Dyas

Introduction ....Mary Dyas

Project Description ....Mary Dyas

Environmental Assessment

Air Quality.. .Jacquelyn Leyva Record

~~Biological Resources..Andrea Martine and Carol Watson~~

~~Cultural Resources...........................Thomas Gates, Michael McGuirt and Melissa Mourkas~~

Hazardous Materials Management ....Alvin Greenberg, Ph.D.

~~Land Use..Michael Baron~~

Noise and Vibration .... Shahab Khoshmashrab

Public Health .... Huei-An (Ann) Chu, Ph.D.

Socioeconomics ....Steven Kerr

Soil and Water Resources... Abdel-Karim Abulaban, P.E.

~~Traffic & Transportation.. John Hope~~

Transmission Line Safety and Nuisance .... .Obed Odoemelam, Ph.D.

~~Visual Resources ....Mark Hamblin~~

Waste Management ....Christopher Dennis, P.G.

Worker Safety & Fire Protection ....Alvin Greenberg, Ph.D.

Engineering Assessment

Facility Design .... Shahab Khoshmashrab

Geology & Paleontology .... Casey Weaver, C.E.G.

Power Plant Efficiency.. Edward Brady

Power Plant Reliability.. Edward Brady

Transmission System Engineering .... Mark Hesters and Sudath Edirisuriya

~~**Alternatives**..Jeff Juarez~~

Compliance Conditions and Compliance Monitoring Plan..............................Mary Dyas

Project Assistant ....Alicia Campos